THE PRINCIPLES OF PLANNING BUILDINGS

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THE PRINCIPLES OF PLANNING BUILDINGS

AN ANALYTICAL TREATISE FOR THE USE OF ARCHITECTS AND OTHERS

BY

PERCY L. MARKS, Architect

AUTHOR OF "THE PRINCIPLES OF ARCHITECTURAL DESIGN"

BEING THE THIRD EDITION OF
"THE PRINCIPLES OF PLANNING"
REVISED & ENLARGED, WITH MANY
ADDITIONAL EXAMPLES

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Containing over two hundred Plans of Buildings of Various Types, chiefly of Executed Works of Eminent Modern Architects

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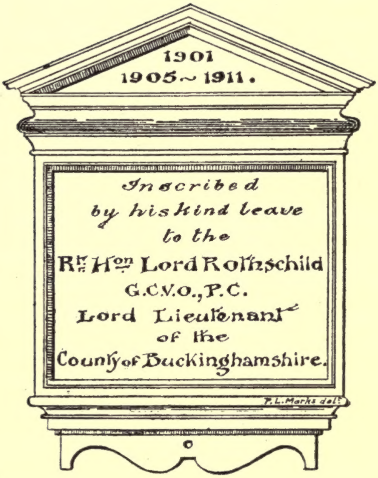

1901
1905 ~ 1911.

Inscribed
by his kind leave
to the
Rt Hon Lord Rothschild
G.C.V.O., P.C.
Lord Lieutenant
of the
County of Buckinghamshire.

P. L. Marks delt.

PREFACE TO THE THIRD EDITION.

It is with feelings of gratitude, twofold in their application, that the author pens these few lines of preface.

In the first place, it is perhaps correct to refer to the public, that has so kindly shown its appreciation of the author's labours, as to entail upon him the further labour of preparing this third edition for issue on the completion of the first decade of the book's existence. As a matter of historical fact, it may be remarked that the stripling was in a state of suspended animation for a twelvemonth between the periods of the two former editions.

In the second place, the author desires to record his grateful thanks to all those concerned, who have so generously placed at his disposal the materials for further illustration of this book. Various of His Majesty's Government Departments are included in these thanks, and the authorities at the War Office very kindly filled in (as far as public policy justified) from the plans of that building the names of the several rooms thereon shown. Though still mainly concerned with plans, opportunity has been taken to introduce a few illustrative sections and details.

The author has personally prepared all drawings for reproduction, saving the following plans, namely, the Battersea Central Power Station (already appearing in the Second Edition), the Piccadilly Hotel, Hamilton Parish Council Buildings, Kensington High Street Flats, Houses at Hampstead Way, and the diagram details of Cinematograph fittings. Some re-arrangement of the text has been indulged in, mainly with the view of gathering within the confines of a separate chapter the remarks upon "Houses" hitherto to be found in Chapter III. The text has at the same time been extended in that respect and also by the addition of a chapter on Acoustics, and in sundry other ways. Artisans' Dwellings as well as Flats are still retained in Chapter III.

It will be well here to rebut the criticism as to the abnormal disproportion between that chapter and the remaining section of the book. It should surely be obvious, that whereas every building possesses individual essential features and individual requirements in accommodation, the properties included in the other "Principles" do not lend themselves to discursive or individual treatment of a similar nature.

The author is perhaps lacking in the poet Byron's sensitiveness as to the introduction of matter not of his own creation; and so largely is this shown in the illustrations, that a proportion of similar introduction in the text is permissible; but the sources of information are made sufficiently evident.

He must take this opportunity of testifying to the boundless trouble and unfailing interest taken by the publisher in connection with the book from its earliest—ay, even from its pre-natal days, and this Preface shall conclude with the expression of the author's thanks to Messrs Batsford.

PERCY L. MARKS.

ALBERT BUILDINGS,
49 QUEEN VICTORIA STREET,
LONDON, *February* 1911.

⁂ Since preparing the above preface, the deaths of two contributors to the illustrations within have occurred—namely, Mr Alex. Cullen and Mr H. N. Hawks—and the author desires to express here his deep regret and at the same time his high appreciation of the designs respectively attributable to those architects.

A more cheerful note will be sounded, in congratulating Mr Ernest Newton on his recent election as an Associate of the Royal Academy.

April 1911.

PREFACE TO THE SECOND EDITION.

IN the preface to the first edition of this book, the author had occasion to record the kind co-operation he met with from those to whom he applied for the use of plans in illustration, which kindness has been continued in the preparation of this edition, plans having been freely lent for the purpose. Mr Stanley Peach has kindly lent, for direct reproduction, the black and white transfers of the Battersea Central Power Station. In every other example the author has personally prepared the drawings, and he has taken the opportunity to add scales to them, many having been left unscaled by him in the first edition.

There has been considerable enlargement as regards both illustrations and text, the latter having also been subjected to close revision, whilst further matter of interest is introduced in the form of appendixes.

The author desires to express his appreciation of the reception accorded to his book, and likewise his hope that the new edition will meet with as cordial a welcome as the first received.

A suggestion was made that the plans should be submitted to analytic examination by the author, but this would be an ungracious act of hypercriticism; for whilst it may be readily understood, that the plans included appeal to him on account of their general excellence, yet they are but illustrative, being merely good examples, and not professing to be exemplars. It is a peculiarity belonging to architectural conceptions, that a plan but rarely admits of reproduction in its entirety, and many seemingly weak points are merely the outcome of local conditions and cliential requirements, which remove them from the plane of animadvertive criticism.

PERCY L. MARKS.

December 1904.

PREFACE TO THE FIRST EDITION.

THE production of the following chapters has been of the nature of what is aptly termed a labour of love, and is the outcome of the pleasant occupation of many leisure hours.

Whatever value the text may have will be very much enhanced by the illustrations of executed works and of those destined for erection ; and the writer's thanks are due for the kindness and consideration he has met with in response to his requests for permission to reproduce plans of specific buildings. For the mere permission thanks are due and are heartily recorded ; but when this is accompanied by evidences of labour specially undertaken for the purpose, and by the offer to give every facility and supply any desired information, then the obligation conferred is largely augmented : this additional obligation the recipient would not wish to be lessened in the slightest degree ; he is satisfied to call attention here to the kindly *esprit de corps* which was doubtless to a large extent a factor.

Attention should be given to the fact that the drawings are all reproduced without scales being given. Various reasons might be offered in explanation, but it suffices to remark that in the majority of instances the plans are meant to be merely illustrative of the accommodation or disposition desirable in any specific class of building. In various examples, where figured dimensions are of value, they are introduced, and in such cases will serve to give scale to the drawing, but in general it was considered inadvisable to reproduce scales for such small drawings.

PERCY L. MARKS.

ALBERT BUILDINGS,
49 QUEEN VICTORIA STREET,
LONDON, *December* 1900.

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THE PRINCIPLES OF PLANNING BUILDINGS.

CHAPTER I.

INTRODUCTORY REMARKS.

OF the varied phases of an architect's life-work there is none, requiring greater consideration and more careful treatment than the planning of buildings, and it is hoped that the course, pursued in the following chapters, will prove acceptable.

The leading idea is to show the *principles* of planning in close theoretical and practical association; in this way it may be clearly seen where and to what extent liberties may be taken.

It is unfortunately much too common an error to consider formulæ as the Alpha and Omega, but it is well to bear in mind the hackneyed proverb, "The exception tests the rule." Our Teutonic friends are said to carry this test to the extreme, by their acknowledgment of more exceptions to a rule than instances of it; and though there is probably some exaggeration in the charge, yet they are to be congratulated on their refusal to adhere rigidly to any rule, which in its nature should admit of flexibility.

Of course the very nature of a rule implies that it should be more often followed than broken, but the closer we approach to an equation in regard to instances and exceptions the more credible will be the above paradox. For the present let it be borne in mind, that a more pleasing work of art is obtained by the use of light and shade and perspective effects than by the mere outline of any object.

Perspective effects! The term is used advisedly, as the result desired may necessitate some modification of the principles to be dealt with in this book; they must be accorded their relative (not their absolute) value, when worked in conjunction; failing this, buildings frequently prove unsatisfactory on analysis; for, if the component parts be faulty, a satisfactory whole will not result.

It is futile to attempt anything without certain guiding principles, but these must not always be inflexibly observed.

In most branches of learning, Theory is apt to prove too severe a teacher and to insist on the restrictions imposed by her somewhat prejudiced ideas; it may in fact be asserted, without fear of undue opposition, that she would make an excellent servant, though often inclined to be a tyrannical mistress.

It has been deemed advisable to state the *principles* in close succession in the first place, defining their nature merely, so as to obtain an easy grasp of the essentials of practical planning.

The enunciation of broad principles is followed by their more detailed consideration, the chapter on Essential Features and Accommodation having an *appearance* of exaggerated importance, compared with later chapters dealing with other principles. But it must be borne in mind, that whereas the first considered points necessarily differ entirely for the various classes of buildings, the remaining principles are less liable to such great differentiation, and consequently call for more concise treatment. But their importance is not therefore to be minimised or at all discounted.

It has been deemed advisable in this new edition to remove the consideration of domestic work to a self-contained chapter, and as a consequence, opportunity has been taken to give a largely increased proportion of illustration.

A certain amount of overlapping may be unavoidable, as also an incompletely systematised treatment, but it is hoped that with the aid of a good index, the result will prove satisfactory.

It is impossible to deal with all the varying conditions that may arise, and moreover it would be beyond the scope of this book to attempt it. But the principles being explained and at the same time exemplified, it should be an easy matter to deal with most cases arising in the course of an architect's practice; and should there be problems where this book fails to throw adequate light, the talent of the architect should be equal to their solution. It is therefore to be clearly understood, that the following pages are not written with the design of forming an easy "crib" for particular cases; were this the central idea, the arrangement of the contents would have assumed a very different form. The information contained within requires careful assimilation, to yield the nourishment that might reasonably be expected.

It is a great mistake for any text-book to attempt to be the means of shutting the door on all original thought. Some writer has wisely remarked that "there is no substitute for thought"; within limitations, this is true. The duty of all who write educational books ends in that connection when they have rough-hewed the steps to Parnassus *; each wayfarer should be armed with the staff of intelligent perseverance as an assistance in the ascent. The personal element, present in the endeavour to surmount difficulties, exerts a beneficent influence and enables those who thus persevere, to attain to those loftier heights, which are the objects of envy to the multitude gazing upwards, though they prove to be the inheritance of only a small and select band.

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* The simile is permissible, though prose and not poetry is in question.

CHAPTER II.

ENUNCIATION OF BROAD PRINCIPLES.

THE first point, that calls for attention, is the GENERAL SCOPE of the building to be planned; and intimately associated with this should be the attention paid to the REQUIREMENTS IN ACCOMMODATION AND SIZE.

As illustrating the reference to *general scope*, the cases of a hospital and a prison may well be contrasted; the former would require a maximum of window surface and an extended ground plan, where the latter would show a maximum of solid wall and a relatively restricted site. This rapid consideration is very desirable, as it frequently serves to give the architect a preliminary glimpse of the scheme as it will be developed later, and therefore has a distinct value of its own.

THE RELATION OF THE SITE TO ADJOINING BUILDINGS should also influence the moulding of the architect's scheme; and this influence would be felt, whether the position of the proposed building were isolated by standing in the midst of acres of private ground or whether closely hemmed in on a busy thoroughfare. In these illustrations it is evident, that there is a great contrast between the assured freedom from the restrictions caused by "Ancient lights" and invasion of privacy in the former case and their probable occurrence in the latter.

Under ordinary circumstances, CORRIDORS *should only be provided as may be necessary;* the statement is current that increase of corridor (or its equivalent) is coincident with increase of luxury, and though an architect will not find fault with clients' expansive and expensive ideas, yet it is as a rule his duty to secure economy of "service", as this is of great importance for obtaining comfort, In blocks of Offices and certain other classes of buildings, there is necessarily a large amount of corridor in the aggregate, but the principle does not vary. A note of warning may be sounded to the effect that, in the endeavour to avoid excess of corridor, an architect should refrain from making one room the sole means of communication with any other.

ASPECT should be dealt with on its own merits, but may have to be considered conjointly with the peculiarities of the site, as the contour of the surrounding country may in some instances produce effects requiring treatment, differing from what would be desirable by merely noting the points of the compass.

PRIVACY is necessary both for screening the interior of one room from others, and also of all rooms or any room from the entrance doors, corridors and elsewhere.

ROOMINESS, though not always obtainable, should be striven for; and judgment being used, the avoidance of a cramped effect may result, even where the actual dimensions are small. "Cribbed, cabined and confined" is too often the concrete issue of an architect's abstract ideas.

FURNITURE REQUIREMENTS, failing consideration, supply a fruitful source of discomfort; and this does not apply to merely one class of buildings, but is of general application.

PROSPECT must be duly considered, though it is not as important as some others of the points above noted; it may, however, be conceded, that to take advantage of the beauties of nature's landscapes should be considered a law of Art.

GROUPING is another point for consideration. In the strict acceptation of the term, it might be permissible only to discuss the relative position of blocks of rooms or the mutual relation of departments; but the term may well be given an extended significance, which will prove beneficial to the system that is used in this book.

PLANNING in its relation to the elevations must be borne in mind whilst working on the scheme, as it will be found to be advantageous to the plans and not detrimental to the elevations to any appreciable extent; if, on the contrary, each is schemed irrespective of the other, it proves in the end injurious to one and perhaps both.

ECONOMY is not an invariable consideration, but in a large majority of cases architects are under the necessity of striving to make one sovereign give the value of two; and though there may be pleasure in working out a scheme untrammelled by any motives of economy, yet there is a keener delight in the successful accomplishment of "cutting the coat according to the cloth"; it is essential that it should be done successfully, otherwise the sensations of both architect and client are the reverse of pleasant.

A feature of economy in respect to public buildings of an administrative character is AXIALITY; it is of importance both to the economical administration of the working staff and also important by reason of the saving in time and temper on the part of the visiting public. But Axiality is often wrongfully regarded as a principle of Art, whereas it is wholly one of Science, in relation to buildings.

ACOUSTICS are considered, but it will be noticed that, even after the lapse of many decades, as a science it is still in the empirical stage.

There are many minor points to be dealt with in the attempts to produce a satisfactory plan, and these are considered later in the book, though it is unnecessary to make separate mention of them at this place.

But there is one matter that may be fitly mentioned here, and this is the advice tendered by M. Guadet*, urging architects to imagine that they may, at some time or other, be guests or inmates in some of the various buildings designed by them; by this means, they will throw their whole energies into providing a generous scheme in each instance.

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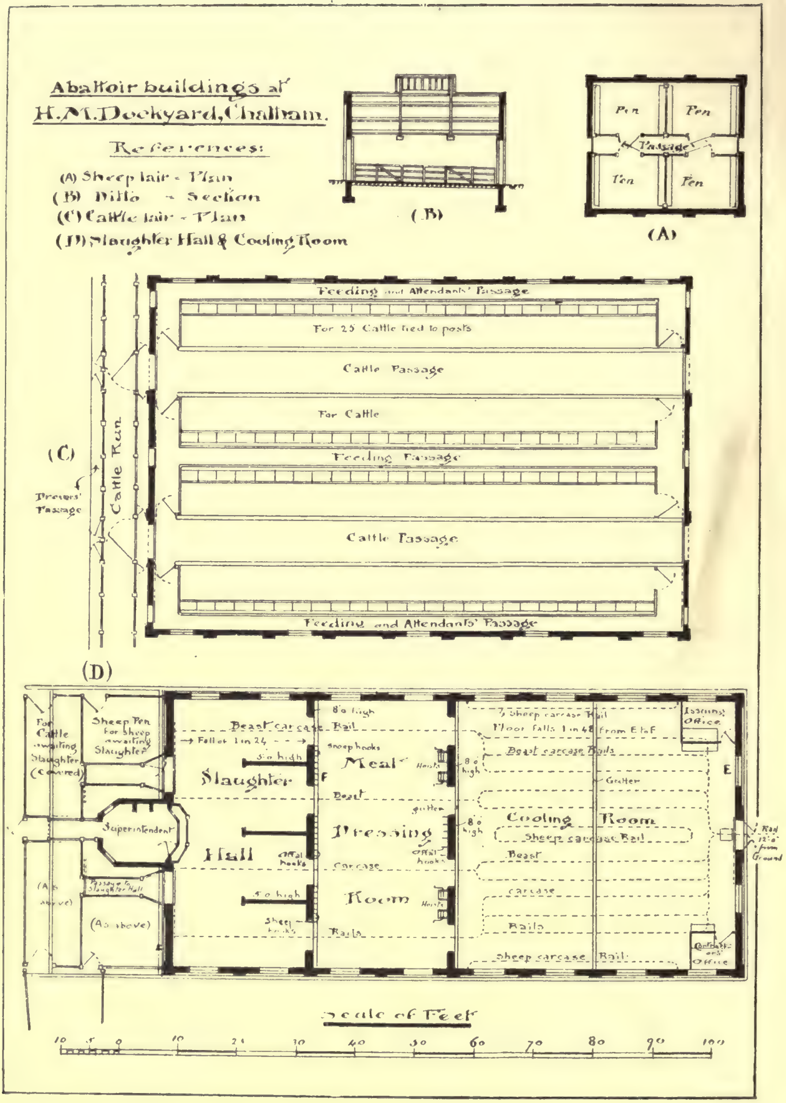
* "Eléments et Théories d'Architecture."

6'

Plate I.


Abattoir buildings at
H.M. Dockyard, Chatham.
References:
(A) Sheep lair - Plan
(B) Ditto - Section
(C) Cattle lair - Plan
(D) Slaughter Hall & Cooling Room
(B)
Pen
Pen
Passage
Pen
Pen
(A)
Feeding and Attendants' Passage
For 25 Cattle tied to posts
Cattle Passage
For Cattle
Feeding Passage
Cattle Passage
Feeding and Attendants' Passage
(C)
Drovers' Passage
Cattle Run
(D)
For Cattle awaiting Slaughter (covered)
Sheep Pen for sheep awaiting Slaughter
Superintendent
Passage to Slaughter Hall
(As above)
(As above)
Beast carcase Rail
→ Fall of 1 in 24 - - →
5'0 high
Slaughter
Hall
Offal hooks
5'0 high
Sheep hooks
F
8'0 high
Sheep hooks
Meat
Beast
gutter
Dressing
Carcase
Offal hooks
Room
Rails
Hoists
Hoists
8'0 high
8'0 high
Sheep carcase Rail
Floor falls 1 in 48 from E to F
Beast carcase Rails
Gutter
Cooling Room
Sheep carcase Rail
Beast
carcase
Rails
Sheep carcase Rail
Issuing Office
E
Rail 12'0" from Ground
Contractors' Office
Scale of Feet
10 5 0 10 20 30 40 50 60 70 80 90 100

CHAPTER III.

ESSENTIAL FEATURES, ACCOMMODATION, ETC.

In the previous chapter it was stated that the *general scope* of a building makes the first demands on the architect's thoughts. This was advocated on sufficiently strong grounds, and it will be now advisable to compress, in as short a space as possible, the essential features and the requirements in accommodation &c. of different classes of buildings. When an architect is desired to scheme, say, a theatre, his thoughts would assume some such form as this :—A theatre requires a well-arranged stage, with all the accessories of dressing-rooms, "green-room", gridiron, scene docks, &c., &c., a sufficient area for the auditorium, adequate entrances and exits (the latter especially), and due heed must be given to optical and acoustic requirements—The above gives at a glance the essentials of a theatre plan. Fire resistance is, of course, all important, but as it has but very slight influence on the plan, it scarcely merits inclusion in the above summary and is only mentioned here to account for its exclusion. "Natural" lighting is of secondary consideration in a theatre.

The architect, bearing in mind the essential features, will proceed to schedule the requisite accommodation ; if he is furnished with specific instructions, his task is in a manner simplified, though it does not relieve him from the responsibility of revising the list, if necessary or desirable. Obtaining his client's written sanction to such revised schedule is an advisable proceeding.

It would be going beyond the scope of this work to enter into the matter of cost, and it may be better for the immediate purpose to be free from the trammels of restricted outlay, yet always remembering that under average conditions the best planning is that, which provides the greatest possible economy of "service".

The lists that follow can for the most part merely note generalities, and this is more in keeping in a treatise such as the present one, as distinguished from a book dealing with some specific class of buildings.

The essential features and the requisite accommodation may overlap and repeat in places in the following lists, but are generally distinctive. For facility of reference the lists are arranged in alphabetical order, as it has not been deemed possible to pursue any other system successfully. It may be premised that the lists marked (*a*) give essential features, and those marked (*b*) the requisite accommodation.

Abattoir.—(*a.*) Plentiful accommodation for animals in reserve and under treatment, uniform temperature, good lighting and ventilation, economical service, privacy, ample cold storage.

(*b.*) Lairs and pens; slaughter-halls (killing-sheds) for the various animals; cooling, salting and pickling rooms; cold stores and chill rooms; courts for sorting out the animals; tallow-melting rooms, with coppers; tripe cauldrons; rooms for preparation of by-products; pathological room; superintendent's quarters; offices; machinery for registering and weighing; stores; latrines; workmen's baths; mess-rooms and kitchen; boiler-house; water-raising engine; destructor for offal and condemned meat; stables and cart shed; caretaker's rooms, &c.

There is no distinctive unit of accommodation, except so far as an approximate calculation may be made in regard to the number of animals, that can be simultaneously accommodated. It is to be borne in mind, however, that sheep and pigs should be allowed a floor space of not less than 6 ft. super. per head, calves and oxen to be allowed 8 ft. and 24 ft., individually and respectively. One tallow-melting room to each eight slaughter-houses; one tripe cauldron (say 30 ft. by 15 ft.) to each four slaughter-houses; 45 gallons of water to each head of cattle.

Each slaughter-house (killing-shed) should be of ample size, with dwarf partition walls, to separate animal from animal. The various processes should be effected so as to prevent living animals seeing (and smelling) them, even to the slightest extent.

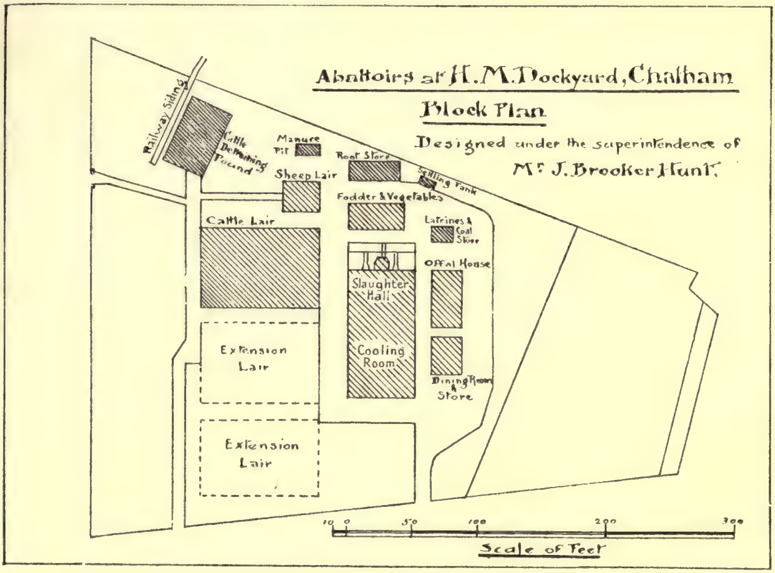


FIG. 1.

The floors of lairs and slaughter-houses must be laid to regular falls.

Chill rooms are for carcases to be hung up in temporarily, so as to eliminate most of the animal heat, prevalent in the beasts newly slaughtered. This chilling process prevents the condensation that would result, if direct cold storage were used.

The coppers are required for boiling down the fat. There should also be a pit for the offal, which may be burnt in a destructor furnace on the premises, or it may be carted away at frequent intervals from the pit for disposal elsewhere. Lairs and slaughter-houses for suspected and infected beasts should be provided.

The salient angles should be in all cases well rounded, so as to minimise the chances of collision and abrasion; the interior angles should be similarly treated for sanitary reasons.

On Plate I. and Fig. 1 the abattoir at H.M. Dockyard, Chatham, is reproduced by the kind permission of H.M. Admiralty and of Mr R. S. Ayling.*

Almshouses.—(*a.*) Compact accommodation, aspect, lighting, ventilation, prospect.

(*b.*) Living-room, scullery, bedroom accommodation, domestic offices, separate entrance to each dwelling, common room.

The guiding principle is to remember, that these retreats for aged respectable people should be made thoroughly homelike and cheerful; and seeing that the inmates are mostly feeble, there should not be more than one storey above the ground floor; nor should there be any basement, not even to the extent of cellarage. Of course, each dwelling should be self-contained, and on one floor only. The common room is not an indispensable, though a desirable feature. The different rooms should be restricted in size, in the interests of each tenant, so as to minimise the trouble of keeping clean and in order.

On Plate II. is given a plan of some Welsh almshouses designed by Mr George Halliday.

Art Galleries.—(*a.*) Ample accommodation for works of art and for the public, top-lighting in the galleries, symmetrical treatment (under the best conditions), good staircases, thoroughfare treatment of galleries from end to end.

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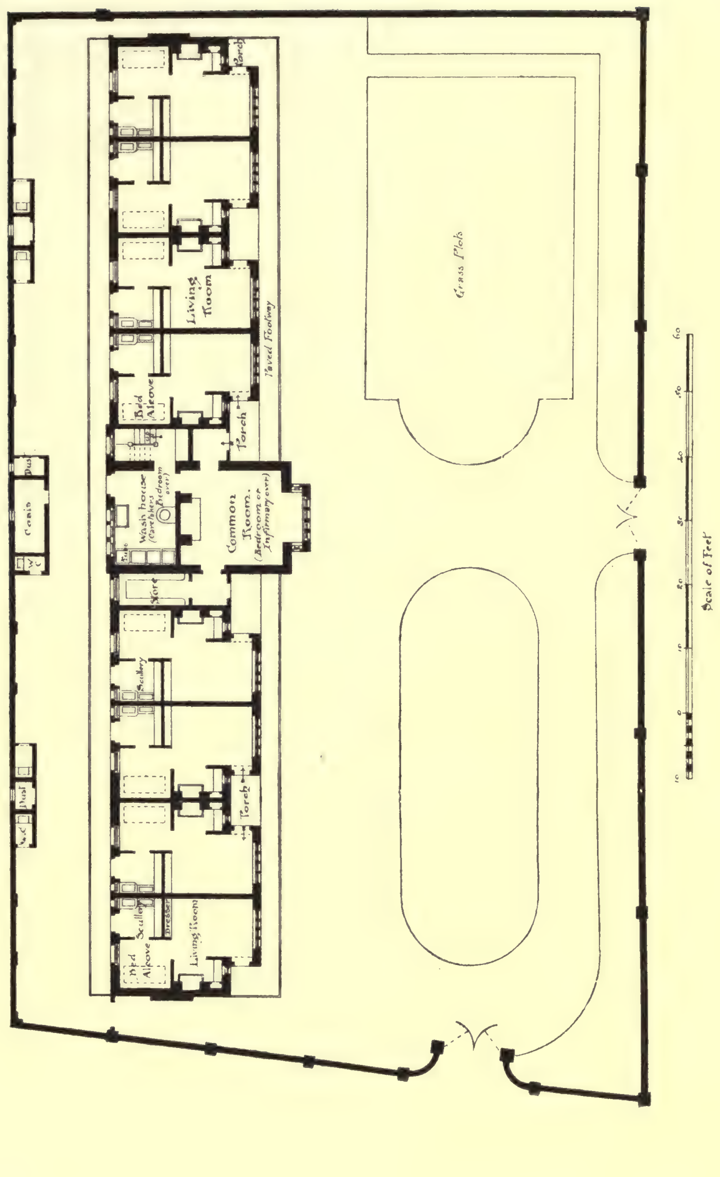
* The illustrations on Plate I. and on Fig. 1 appear (with others) in Mr Ayling's book on "Public Abattoirs" and are redrawn from that source.

Plate II.



The Llewellyn Almshouses, Neath: Glamorganshire.

Architect: George E. Halliday, F.R.I.B.A.

(*b.*) Galleries for various classified works of art, packing and delivery rooms, committee-room, curator's and clerical offices, cloak and umbrella stores, lavatories &c., refreshment-room, picture-hoist, stores, caretaker's rooms, &c.

This accommodation would provide for an important exhibition, either permanent or temporary.

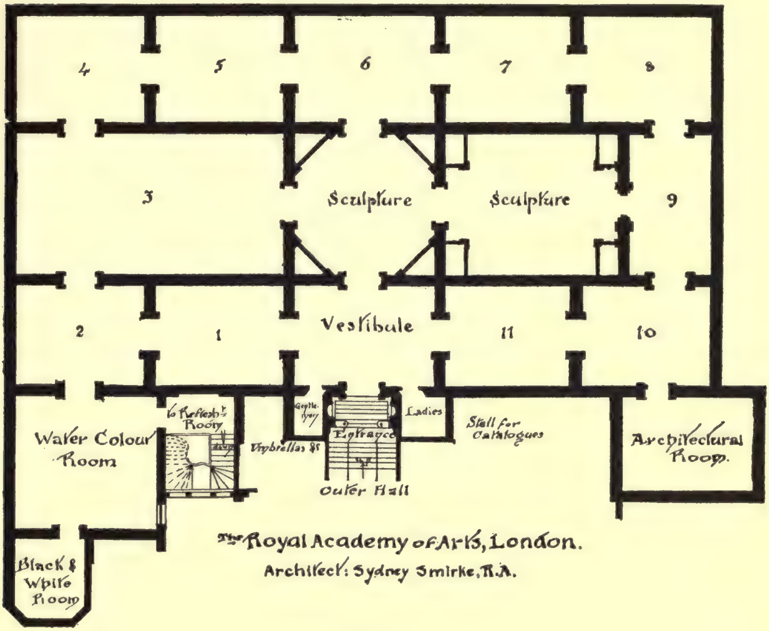


FIG. 2.

As a good example, the plan of the exhibition galleries of the Royal Academy of Arts, London, is given on Fig. 2, the architect being the late Sydney Smirke, who succeeded in producing a very creditable building. It may be noted that for "cabinet" paintings and miniatures a side-lighted gallery is preferable to one that is top-lighted.

[For pictures generally, a vertical light is considered bad, nor should there be any reflection ; a diffused and equal light is the desideratum. Diffused light is not good for sculpture, which has different requirements. It obtains its effect from light directed along a definite line; paintings and drawings have their effects self-contained. Light models sculpture, but must only illumine painting. (Free translation from M. J. Guadet in "Eléments et Théories de l'Architecture.")]

Art Schools.—See under "School of Art."

Artisans' Dwellings.—(*a.*) Economical planning, ample side lighting, great attention to arrangement of sanitary offices; provision of the laundry requirements outside the dwelling, but otherwise each dwelling to be self-contained; good ventilation; provision of suites of varied accommodation; panic exits.*

(*b.*) Living-room, scullery, bedroom accommodation, W.C., larder, coal-store, laundry.

The basis for consideration should be the amount of accommodation that can be provided, so as to allow the buildings to be financially self-supporting; for though philanthropy may find the means at the commencement, yet these concerns should always be calculated on a sound financial basis. It is very rare to find an instance of endowment, which for present purposes may be disregarded.

Though the question of finance is not supposed to be in evidence in this work, yet for the class of building under consideration it has to be dealt with here. Therefore it is necessary to state, as succinctly as may be possible, that the rent to be placed on a room or dwelling should represent the smallest *feasible* return on the capital outlay, which should be expended in the most economical way, so as to distribute the benefit of the expenditure for a maximum number of people.

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* In London, the County Council requires that in any new buildings with storeys more than 60 ft. above the street level, adequate means of escape shall be provided for those employed or dwelling therein. See London Building Act, 1894, Sect. 63.

If slums are to become permanently historic, it can only be by providing for the smallest wage-earners a decent dwelling at a minimum rental. It would be out of place here to enlarge on the subject of the assistance that has been of late years rendered by the Local Government Board, in lengthening the periods of duration of loans, and in granting permission to municipalities to buy land and erect dwellings beyond their borders; cheaper rentals would be possible by these means, but these subjects open up a vast field for inquiry as to further possible facilities that might be granted by Parliament itself, and (as can be easily understood) they are better left for treatment on platform and in forum.

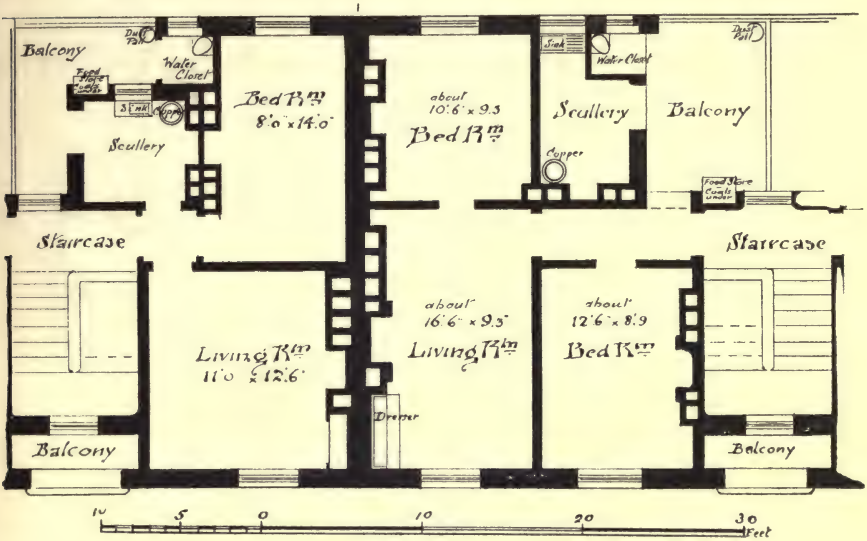
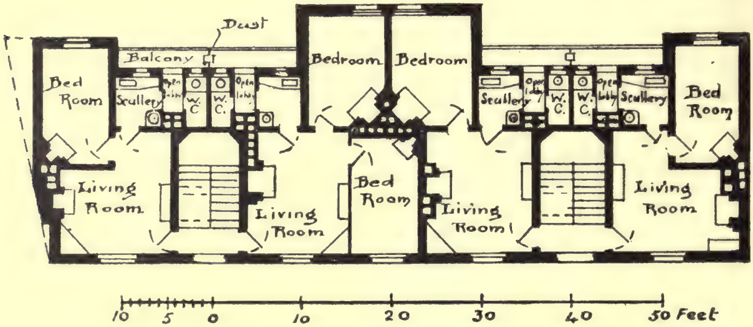


FIG. 3.—PLAN OF PORTION OF ARTISANS' DWELLINGS, MILLBANK.

Messrs Spalding & Cross, *Architects.*

The expenditure on artisans' dwellings usually comprises the purchase money for the land (and interest also if it is a loan), the cost of construction of the buildings and their maintenance, together with taxes, rates and insurance, and a commission also on the rent collection. If the interest in the property is only leasehold, the above expenses will be varied by the payment of ground rent and by an annual reserve for redemption of capital. Also a sinking fund for depreciation is sound finance. It can be readily understood that whilst good sanitary construction is of prior consideration, economy should be always carefully studied.

Plenty of air and light should be provided; it used to be of common occurrence for small houses to be built back to back, but this is now generally condemned. The architect's powers end with the provision of healthily-schemed buildings: it must rest with the owner, the landlord or (in the last instance) the local authority to prevent them from becoming slum dwellings.



London County Council Dwellings, Bethnal Green.
Architect: Thomas Blashill, F.R.I.B.A.

FIG. 4.

The water-closet and the dust-shoot should be kept well away from the living and bed rooms. The roof may be advantageously an asphalted flat for utilisation as a playground, with a portion enclosed for laundry purposes.

Every care should be exercised to avoid chance collections of dust and disease germs.

From personal acquaintance with a large number of the dwellings of the poor, it may be noted that there is, in a majority of cases, great indifference to cleanliness on the part of the tenants. This being so, the architect should strive to minimise the chances of accumulations of dust and other objectionable matter, and this can be effected in different ways:—(1) Corners may be rounded and (2) the angles made by junction of walls with floors and ceilings may be similarly treated. (3) Hollow spaces behind skirtings &c. should be avoided and (4) light should penetrate to every portion of the room. Add to the above (5) the use of non-absorbent materials, which are at once washable and without detrimental effects from this action, and the chance of retention of any foul matter is reduced to a minimum, as far as lies in the architect's power.

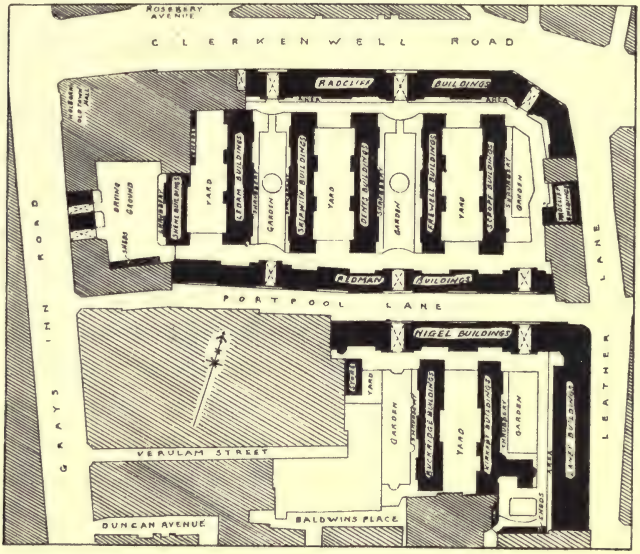


FIG. 5.—BLOCK PLAN OF THE BOURNE ESTATE DWELLINGS. (SEE ALSO FIG. 6.)

Reduced Scale—176 feet to an inch.

If rounded corners are desirable for angles of rooms as above stated, they are of equal value for passage angles, so as to obviate many an unpleasant collision.

The minimum size for a living-room may be taken at

120 ft. super., and one bedroom should be not less than about 130 ft. super. and a second 90 ft. to 100 ft. superficial.*

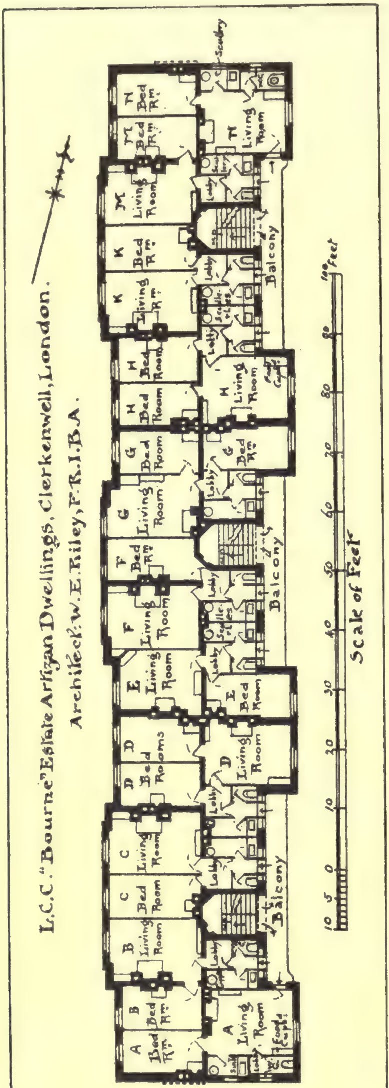

L.C.C. "Bourne" Estate Artizan Dwellings, Clerkenwell, London.
Architect: W. E. Riley, F.R.I.B.A.
Scale of Feet
Balcony
Living Room
Bed Room
Bed Rooms
Lobby
Scullery
Feet

Fig. 6.

The plan given on Fig. 3 is a portion of one of the blocks designed for the London County Council's Millbank Estate by Messrs Spalding & Cross.

In Fig. 4 is shown one of the Boundary Street Area blocks designed by the late Mr Thomas Blashill, formerly Superintending Architect to the London County Council; in interesting conjunction with this there are shown on Figs. 5 and 6 plans by Mr W. E. Riley, the present Superintending Architect. Some notes kindly furnished by him are added (see Appendix H).

It would seem that block dwellings are losing favour with the London artisan; he wants a "garden," not a

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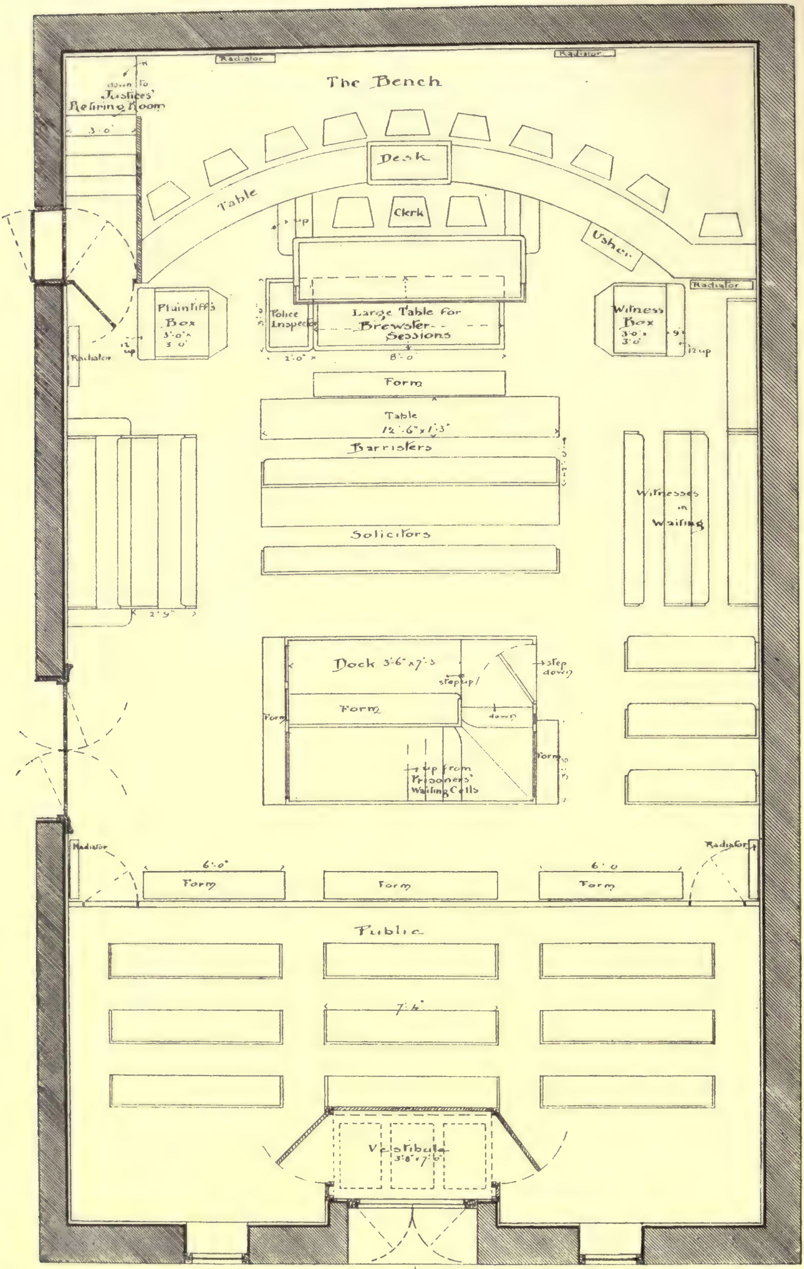
* In the dwellings provided at Tottenham by the London County Council, the minimum size for a bedroom is 96 ft. super.; the provincial authorities are frequently less liberal, 85 ft. super. or less as the minimum size being in evidence. The St Pancras Borough Council (London) has erected buildings giving an average of 160 ft. super. for living-rooms, and from 102 ft. to 129 ft. super. for bedrooms.

Plate III. [*See also* Plate LII.



County and Petty Sessions Court, Bromley, Kent.

Reduced Scale—8 feet to 1 inch.

paved yard, and he is growing too proud to share in the use of a staircase and a wash-house. It is of no interest to him that the other ranks of humanity use the common staircase in flats—for he is a law unto himself.

Municipal and similar lodging-houses (which are intended more especially for the use of the artisan class than for any other) require accommodation in dormitories with cubicles, washing-rooms, dining-room, lodgers' kitchen, smoking-room, reading-room, latrines, workrooms, lockers, administrative kitchen and laundry with their offices, rooms for staff, &c.

Assize Courts, Law Courts, and County Courts.—(*a.*) Accommodation in the Court for the representatives of the Law, the parties concerned, the Press, and the public; good corridor communication, acoustic requirements, lighting and ventilation, grouping, dignified and spacious planning, and (where Criminal Courts are in question) private communication between the day-cells and the dock.

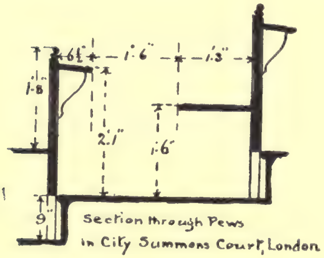
(*b.*) Civil and Criminal Courts, Admiralty Court, Registrar's and other County Courts; rooms for judges, magistrates, grand jury, juries, witnesses in waiting, solicitors, barristers, registrar, high bailiff, Clerk of Peace, judges' and magistrates' clerks, clerk assistants, consultation, bailiffs, Press records, refreshments, &c.; library, great hall, public galleries, lavatories, strong-rooms, indictment office, office for summonses, office for fees, cells for prisoners in waiting; separate entrances for the occupants of the Bench, the public and prisoners.

There should be separate Civil and Criminal Courts provided, and sometimes also Chancery and Sheriff's Courts are wanted. A residence for the Judges of Assize is also a desirable provision.

The above accommodation would form a fairly important building in the provinces, and frequently the list would be curtailed—as for example, only one Assize Court might be provided for all cases, the refreshment room is not indispensable and even the Press room may be omitted; but on the other hand, a Wreck Inquiry Court and other rooms may be required.

In London, barristers customarily robe in their own Chambers, but rooms must, of course, be provided for their use.

In his fascinating work, "Eléments et Théories d'Architecture," M. Guadet expresses his opinion that the focus of the whole building is the Great Hall for consultations (Gallicée, *La salle des Pas perdus*); but whilst this is true to an extent, it is, however, the Court-rooms that require primary consideration, should any question of sacrifice be entailed.



Section through Pews in City Summons Court, London

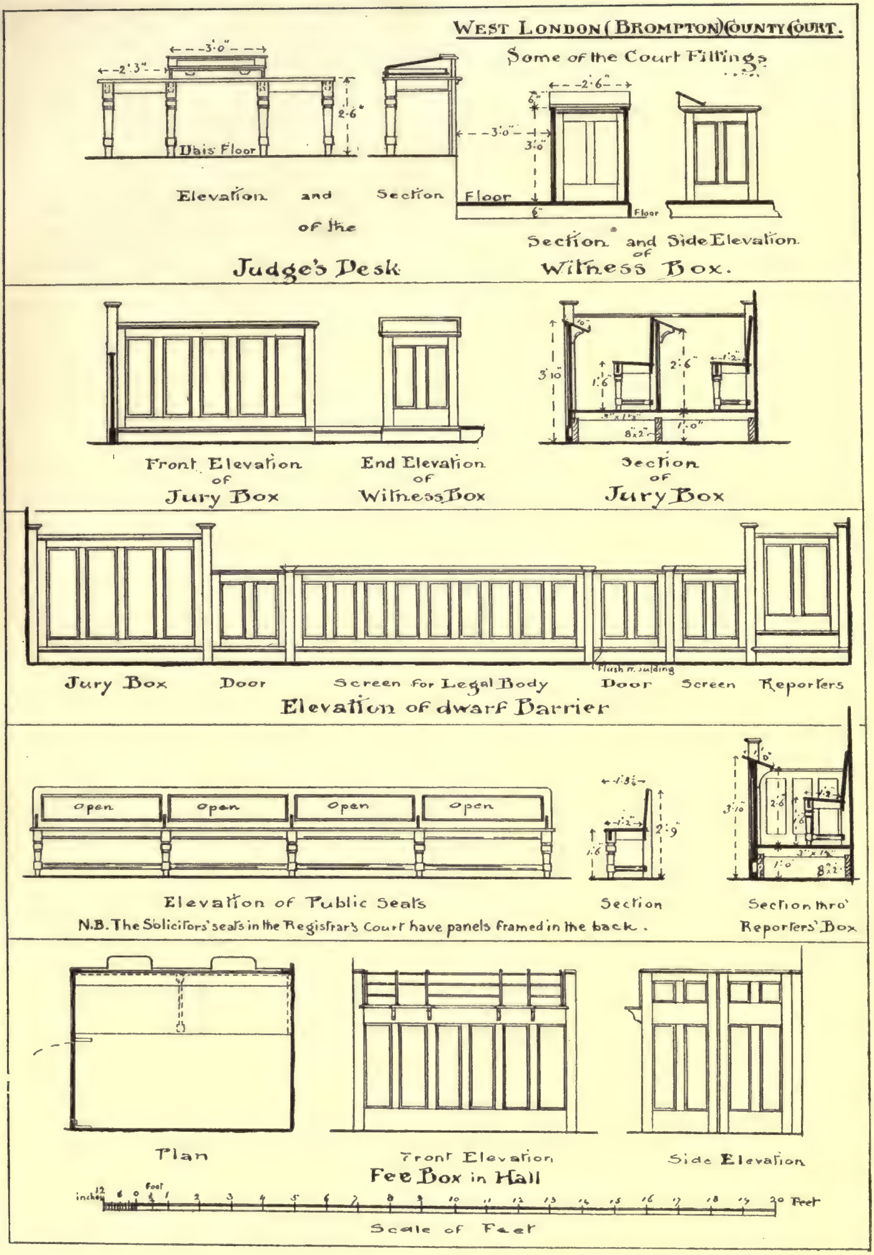
FIG. 7.

In planning the Courts, the amount of gangway is customarily restricted.

When the instructions for the Strand buildings in London were issued to competing architects half a century ago, the width for the various Courts was set at a minimum of 30 ft., and the height of rooms generally was required to be not less than 14 ft.

Opinions apparently differ as to lighting. Mr J. van Pelt advocates side (not end) windows, as the judges should both see and be seen; M. Guadet advocates windows behind the jurors and facing the witness, so as to reveal the facial play of the latter, and to conceal the jurors' emotional display. But this is perhaps only an apparent, not a real difference of opinion. These windows should avoid the portion of compass between south-east and south-west *via* south. The rule would also apply to Criminal Courts, and it is here that the difference of opinion would be noticeable, as the dock faces the Bench. Top-lighting also has its advocates.

Plate IV.


WEST LONDON (BROMPTON) COUNTY COURT.
Some of the Court Fittings
3'0"
2'3"
2'6"
Dais Floor
Elevation and Section of the Judge's Desk
2'6"
6"
3'0"
3'0"
Floor
6"
Floor
Section and Side Elevation of Witness Box.
Front Elevation of Jury Box
End Elevation of Witness Box
10"
3'10"
1'6"
2'6"
1'2"
3"x1½"
8"x2"
1'0"
Section of Jury Box
Jury Box
Door
Screen for Legal Body
Flush moulding
Door
Screen
Reporters
Elevation of dwarf Barrier
Open
Open
Open
Open
Elevation of Public Seats
1'3½"
1'2"
1'6"
2'9"
Section
1'0"
3'10"
2'6"
1'6"
1'2"
3"x1½"
1'0"
8"x2"
Section thro' Reporters' Box
N.B. The Solicitors' seats in the Registrar's Court have panels framed in the back.
Plan
Front Elevation
Side Elevation
Fee Box in Hall
inches 12 6 0
Feet ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Feet
Scale of Feet

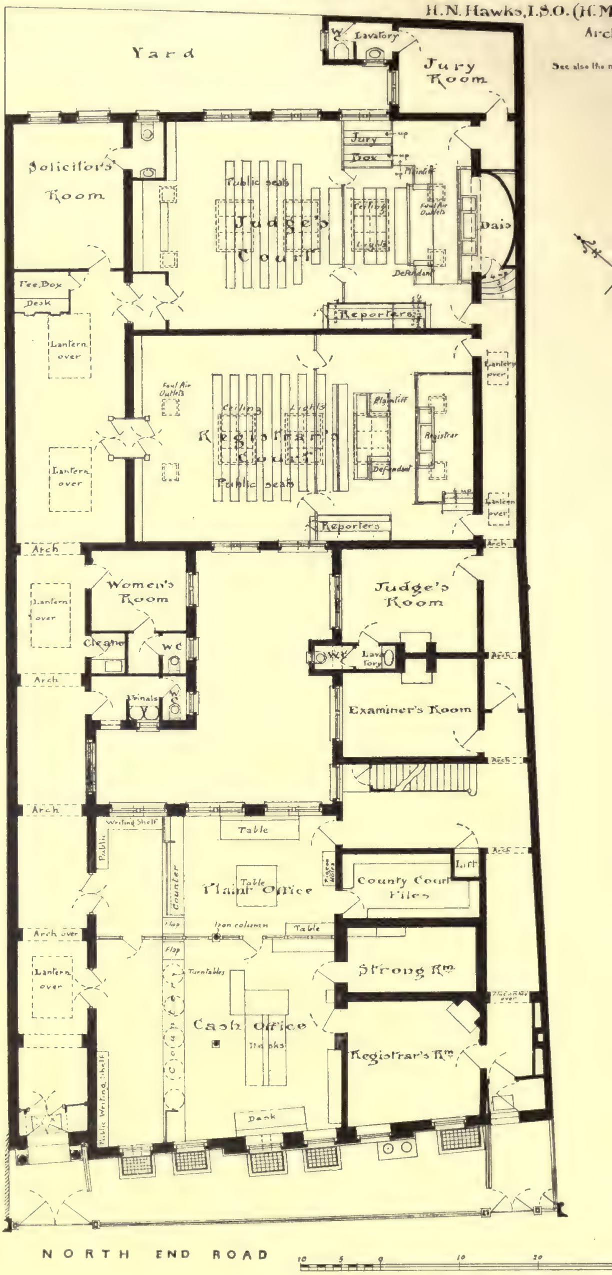
18^2

WEST LONDON (BROMPTON) C

H.N. Hawks, I.S.O. (H.M

Arc

See also the n

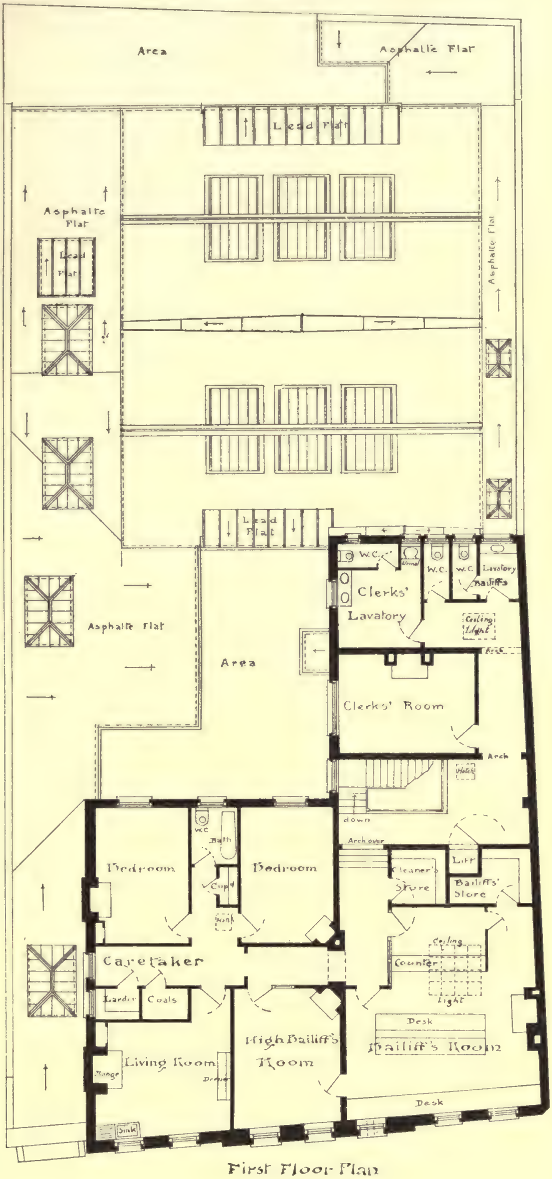


Ground Floor Plan.

183

TY COURT
of Works)

for fittings

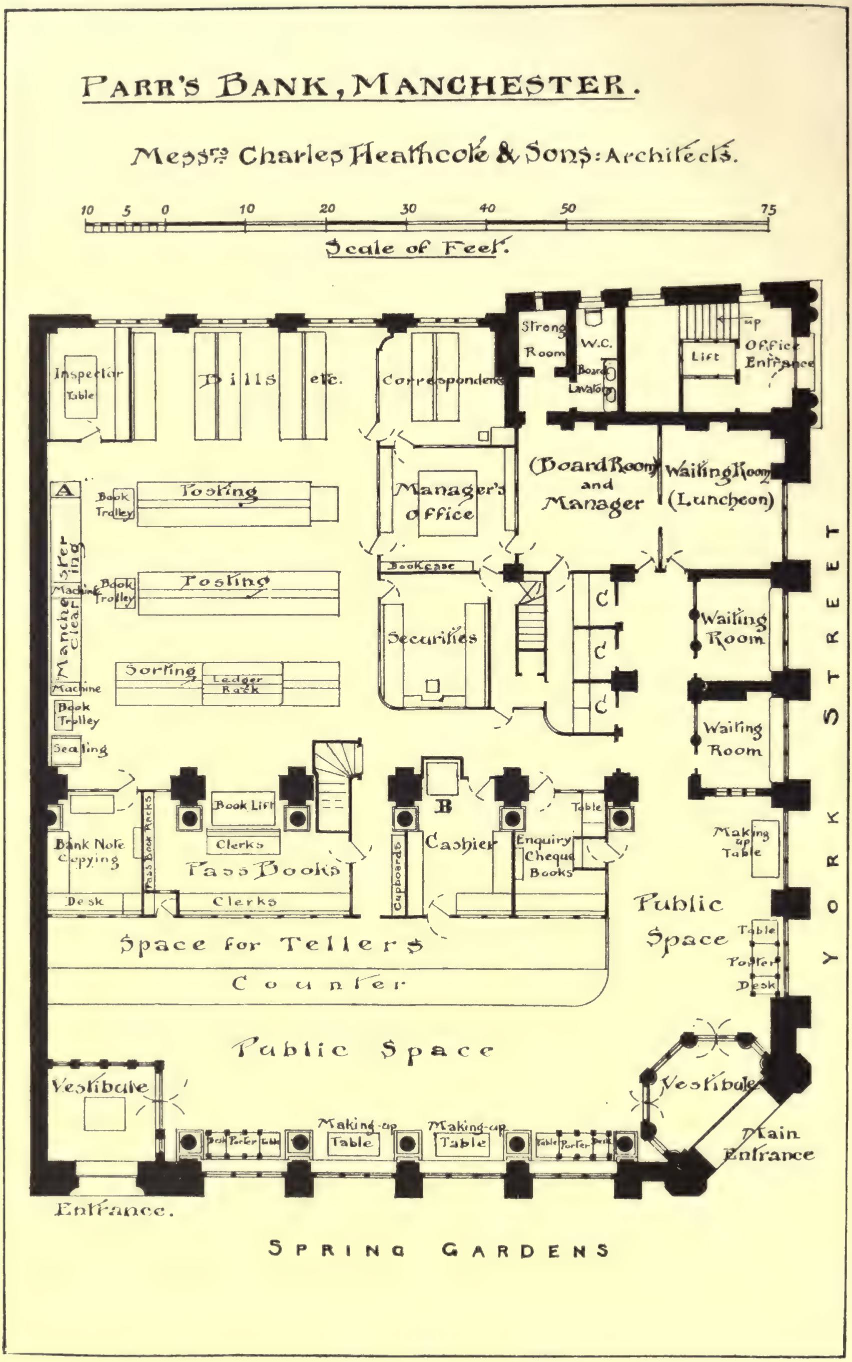


First Floor Plan

[*Between Plates IV. and VI.*

18^4

Plate VI.



A, Bank Calculating Machine. B, Cash Lift. C, Inquiries.

Accommodation in the dock should be provided for several prisoners charged simultaneously *. In Civil Courts two witness boxes may be advantageously provided. The Judges' retiring room should be 12 ft. square and upwards, with lavatory annexe. The Magistrates should have a larger retiring room. Grand jury room should be 20 ft. by 12 ft. or more ; common jury room may be 16 ft. by 12 ft. On Plate III. is shown the Bromley (Kent) Court House, and it will be noticed that in this case top-lighting is used. On Plate V. is shown the West London (Brompton) County Court ; and some of its fittings are shown on Plate IV. In Fig. 7 a section of fittings is shown.

Auction Mart.—(*a.*) Good acoustic properties, lighting and ventilation ; absence of obstructive features (such as piers and columns); seclusion of sale-rooms from the din of street traffic.

(*b.*) Sale-rooms, vestibule and entrance hall ; strong-rooms, offices, storage rooms, lavatories, &c.

It is very necessary that there should not be any obstructions in a sale-room, as the auctioneer should be able to have a free command of inspection over the whole room, so as to identify bidders. And absence of noise from the street is also of first importance, as may be readily understood. Each sale-room must be fitted with auctioneer's rostrum with extended desk accommodation for various assistants. Benches for the public are necessary.

The entrance hall should have plentiful wall accommodation for displaying sale-advertising posters.

Rooms for private treaty sales, office purposes &c. are desirable.

Banking Premises.—(*a.*) Ample accommodation for the public and for the clerical staff ; effective supervision of the former ; adequate separation between the public hall and the official portion; seclusion of strong-rooms; provision of residential accommodation for manager or deputy.

---

* There should be direct access from the prisoners' cells (waiting) into the Dock.

(*b.*) Public hall, cashiers' and clerks' department, manager's and assistant-manager's offices, waiting-room, sometimes luncheon-room; strong-rooms for bullion, books and customers' boxes; service lift, lavatories, W.C.'s and cloaks; residence (containing two living-rooms, kitchen and offices, three or more bedrooms, bath-room, two W.C.'s, stores).

The basis of accommodation is the space required per cashier and per clerk. The former should be allowed 6 ft. by 2 ft. 9 in. counter space, 18 n. depth for standing room, and the gangway in rear should be not less than 2 ft. wide. Clerks should be allowed 2 ft. 6 in. width by 2 ft. 9 in. depth of desk space, 18 in. depth for sitting space, and the gangway in rear should be not less than 2 ft. 6 in. wide. The public should have a gangway at least 8 ft. wide and a depth of counter not less than 9 in. to 12 in. The more frequent to-and-fro carriage of heavy ledgers by the clerks renders necessary a greater width of gangway than in the case of the cashiers.

An ideal strong-room would be situated in the basement and would be surrounded by a zone passage. With a series of contiguous strong-rooms there should be inter-communicating doors internally as a precautionary measure. The external walls of the series should be not less than 1 ft. 6 in. thick and, by preference, steel-lined. Interesting sections of strong-room walls are illustrated in various specialists' catalogues and may be usefully consulted.

A plan by Messrs Charles Heathcote & Sons is given in illustration on Plate VI.

Barn.—See "Outbuildings."

Barracks.—(*a.*) Ample light, air and ventilation; residential and drill requirements, good open position.

(*b.*) Colonel's quarters; officers' quarters, including mess-room, bedrooms &c., billiard-room, reading-room, servants' rooms, guard-room, orderly room; quarters for adjutant, paymaster, quartermaster, barrack-master and barrack-sergeant, for married N.C.O.'s and for privates; men's guard-room, mess-rooms, library and librarian's rooms, reading-room and recreation room; N.C.O.'s bedrooms and mess-rooms; barrack-rooms, ablution-rooms, cells, infirmary, isolation block, mortuary, surgical rooms; sergeants' mess establishment, drummers' rooms; bandsmen's room, yard and practising shed; parade-ground, drill-shed, gymnasium, baths, chapel, canteen and coffee-bar, cook-house, school-house, skittles alley, laundry, workshops for suitable skilled trades, forge and smithy, magazines, armoury, stores, riding-school, stables.

The provision of Brigade Depôt Barracks is carried out in accordance with regulations of the Barracks Improvement Commission, 1861, *et seq.* Only a few remarks are necessary here.

It may be noted in the first place that eight barrack-rooms are as a rule provided in a depôt, to house 224 privates and eight N.C.O.'s. These are planned as two-storeyed double pavilions (one block for each company), thus giving two blocks in all. The private soldier takes his food in these rooms ordinarily. A floor space is allotted per individual of about 60 ft. super. (*i.e.*, 5 ft. 6 in. run of wall by 11 ft. depth to centre of room) and at least 450 cub. ft. of air space. To each of these barrack-rooms an ablution-room, a W.C. and a sergeant's room are attached and the requisite approach and staircase also. All interior angles should be rounded. The married men are provided with living-room, scullery and bedroom. The sergeants' mess establishment contains mess-room, kitchen, larder and cook's room. The officers are accommodated with one, two or three rooms, according as they are of subaltern, captain, or field officer rank respectively. The infirmary contains accommodation for about 6 per cent. of the soldiers in residence, and, besides the ward &c., contains also surgery, orderly's room, cook's room, waiting-room, kitchen and its offices, &c.

It has been noted above, that a good open position is advantageous, and this is the case not only from a hygienic standpoint, but also as a means of attraction to the populace to join the ranks of the army, to which aim a parade is a powerful incentive. This is not of importance, however, in those countries that levy conscription.

It may be noted here, that the proportion of married privates allowed in a company is 6 per cent. approximately.

The substitution of cubicles for the erstwhile open dormitory (barrack-room) is being gradually effected; and though not regarded by the privates as an unmixed blessing, yet on the whole the change is highly appreciated. The accommodation provided consists of a bed, table, chair and cupboard; the associated ablution-rooms are still maintained with advantage; heating would be either by means of radiators in the corridor or else by means of pipes carried through the cubicles. The partitions should be about 8 ft. high and carried down to the ground as between one cubicle and another, but with a space of some 6 in. clear of the floor as between the cubicle and the corridor.

Cavalry stables are planned for a double row of horses with central passage 12 ft. to 13 ft. wide; each horse in stall is allowed about 100 ft. super., exclusive of gangway. The loose boxes are planned 17 ft. by 12 ft. Horses are not to be housed underneath any portion of the domestic buildings.

Infirmary stables are planned for only a single row of stalls and each horse is allotted about 130 ft. super. The guard-room, cells &c. are provided in a block called the "Keep."

In a riding-school the arena should average in length three times the breadth, 100 ft. being but a moderate length, even as a minimum. It must be well lighted by means of high

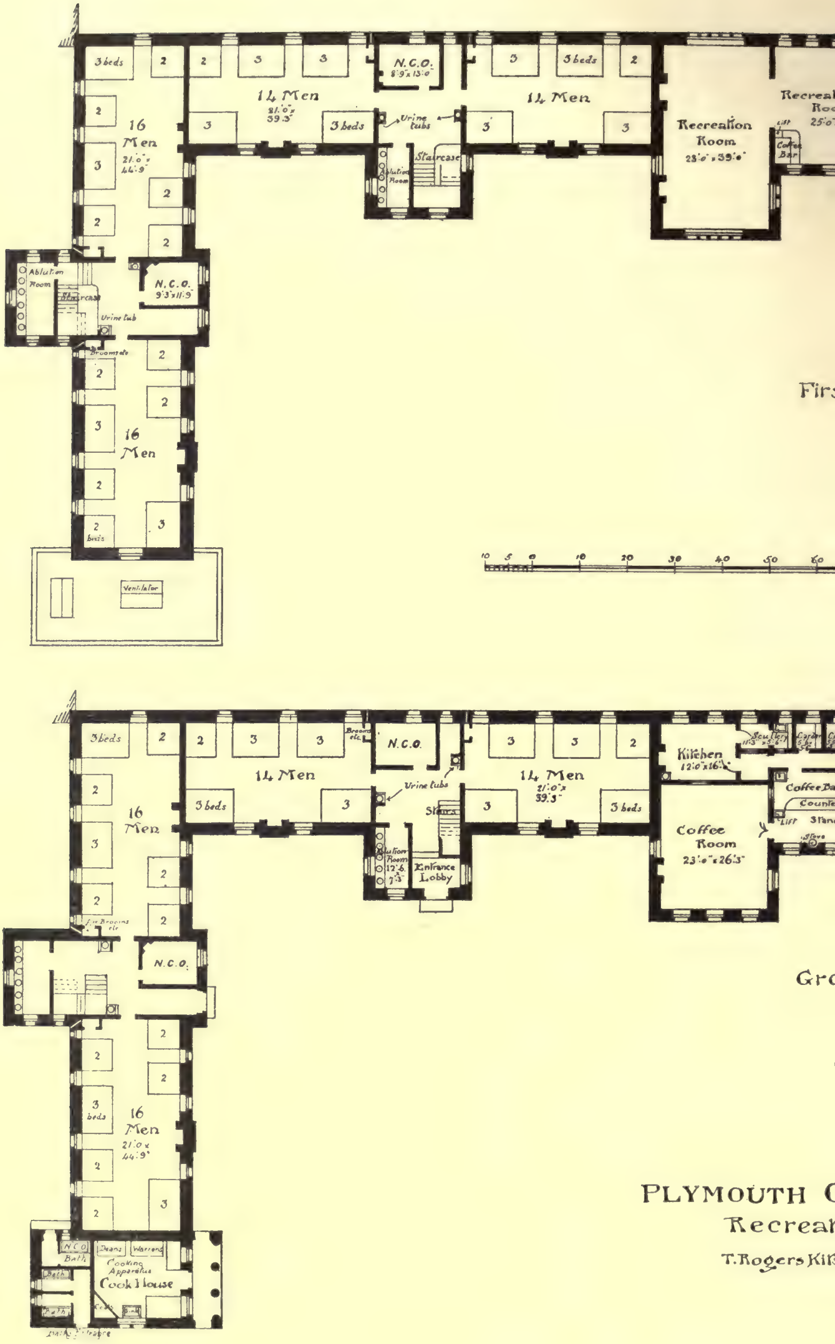
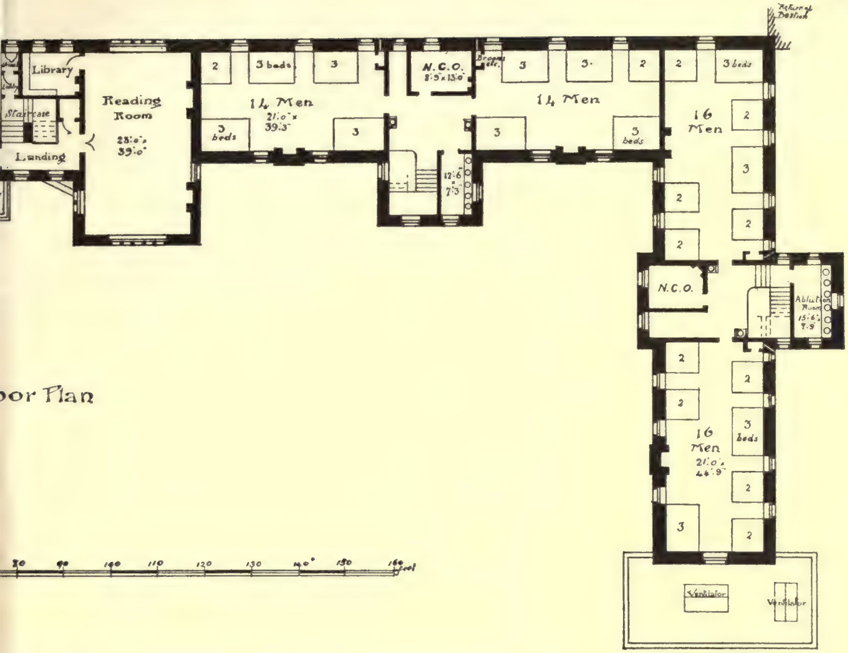
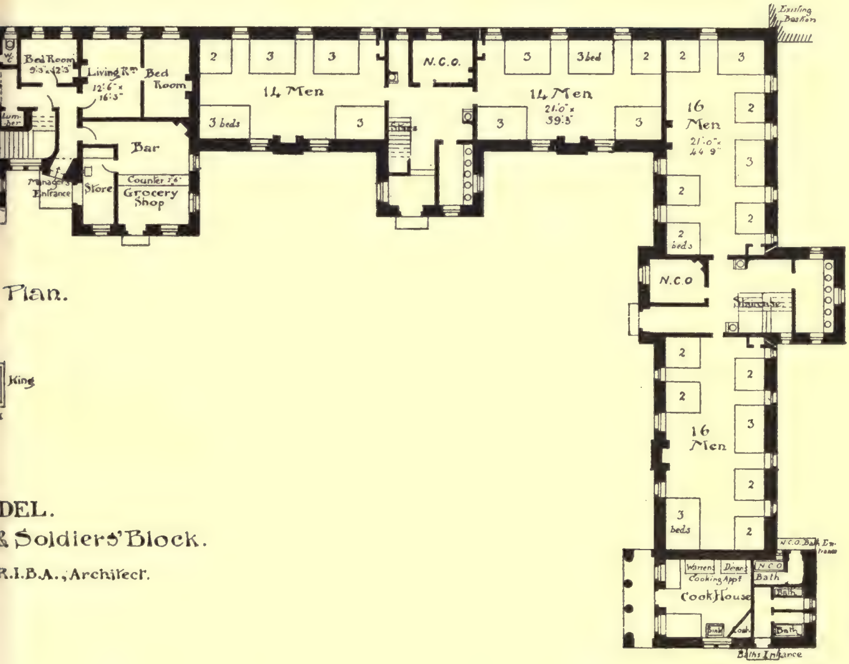

3 beds
2
16 Men
21.0" x 44.9"
3
14 Men
21.0" x 39.3"
3 beds
N.C.O.
8.9" x 13.0"
Urine tubs
Ablution Room
Staircase
Recreation Room
28.0" x 39.0"
Recreat
Roo
25.0
Lift
Coffee Bar
Ablution Room
Staircase
Urine tub
N.C.O.
9.3" x 11.9"
Brooms etc
2 beds
Ventilator
Firs
10 5 0 10 20 30 40 50 60
Brooms etc.
N.C.O.
Urine tubs
Stairs
Ablution Room 12.6 x 7.3
Entrance Lobby
Kitchen
12.0" x 16.
Scullery
Garden
Coffee Ba
Counte
Lift
Stand
Stove
Coffee Room
23.0" x 26.3"
for Brooms etc
3 beds
16 Men
21.0 x 44.9"
N.C.O.
Bath
Bath
Bath
Deans
Warrens
Cooking Apparatus
Cook House
Sink
Baths Entrance
Gro
PLYMOUTH C
Recreat
T. Rogers Kit

Plate VII. 22²



oor Plan



Plan.

DEL.

& Soldiers' Block.

R.I.B.A., Architect.

[*Between pp.* 22 *and* 23.

windows giving diffused light, and thus avoiding strong shadows, for the horse is an animal of such highly-strung temperament, as necessitates these precautions. Windows on all four sides of the hall, or (failing that) on the two long sides, are therefore advisable, and these may well be supplemented by top-lighting. Good ventilation is also very necessary. All projections into the hall within a height of 7 ft. 6 in. from the ground must be avoided. It is well to build the walls as part of a truncated pyramid, whose apex would be at a considerable distance below the floor; for if a horse rubs along the wall, the rider would thus escape injury to his person by crushing. The school should be in direct communication with the stables, for the horses getting covered with sweat, there would be danger in exposing them to a sudden change of temperature.

Plans of a Barracks block designed by Mr Roger Kitsell are illustrated on Plate VII.

Baths and Wash-houses (Public).—(*a.*)—Ample water-area, good entrances and corridor communication, top-lighting preferable for the baths themselves, grouping, economy of heating arrangements.

(*b.*) Swimming baths with or without galleries, slipper, douche, spray, Turkish baths, &c.; dressing-boxes, attendants' boxes, waiting-rooms, W.C.'s, &c.; wash-house, drying closets, mangling and ironing room, trolley-shelter, cloak-room; pay-boxes, superintendent's offices and residence, committee-room, stores, workshops, establishment laundry, mess-room, boiler-house, engine-house, &c. Frequently also club and refreshment rooms are provided; and the provision of a crèche in connection with the public wash-houses is growing in favour.

These buildings are provided in accordance with the Baths and Wash-houses Act, 1846 (9 and 10 Vict., c. 84). Sect. 36 enacts that the number of baths for the labouring classes shall be not less than twice the number of *any* higher class (if but one), or shall be an equal number (at least) to *all* the baths of the higher classes, where there is more than one such higher class.

The Baths and Wash-houses Act Amendment Act, 1847 (10 and 11 Vict., c. 61), sect. 5, has a similarly worded provision respecting washing-troughs.

The provision of these establishments, though highly commendable, leaves room for doubt as to the wisdom of the methods usually employed in England. It is not intended to enter here with any detail into the advisability or otherwise of decentralisation. The existing English method is to have large central establishments, and it is such that will be now considered.

Should there not be any desire to utilise the swimming baths as entertainment halls, the planning will be to this extent simplified, at any rate where the jurisdiction of the London County Council (and similarly stringent authorities) is concerned. But these establishments should in any case command two thoroughfares. There are two distinct portions, viz., the semi-recreative "baths" portion and the utilitarian "wash-houses"; they should be kept quite separate, and may well be planned to be entered from different streets. Instances are frequent, of course, where merely the public baths are provided, but for present purposes it will be better to deal with the combined requirements.

Where space is ample, separate entrances may be provided, if desired, for the various "classed" baths, as well as for the two sexes. Where space is limited, an entrance for each sex may suffice, and indeed some people would contend that one entrance from the street can be condoned, and it has certainly been employed. But undoubtedly it is better that ladies should not be compelled to choose between the risk of being shouldered by the rough third-class element of the male sex, or of avoiding the use of the establishment altogether.

After leaving the pay-box, there should be a parting of the

Plate VIII.

St. Pancras Public Baths and Wash-houses
Prince of Wales Road, London.
Architects: Messrs. Thos. W. Aldwinckle & Son.

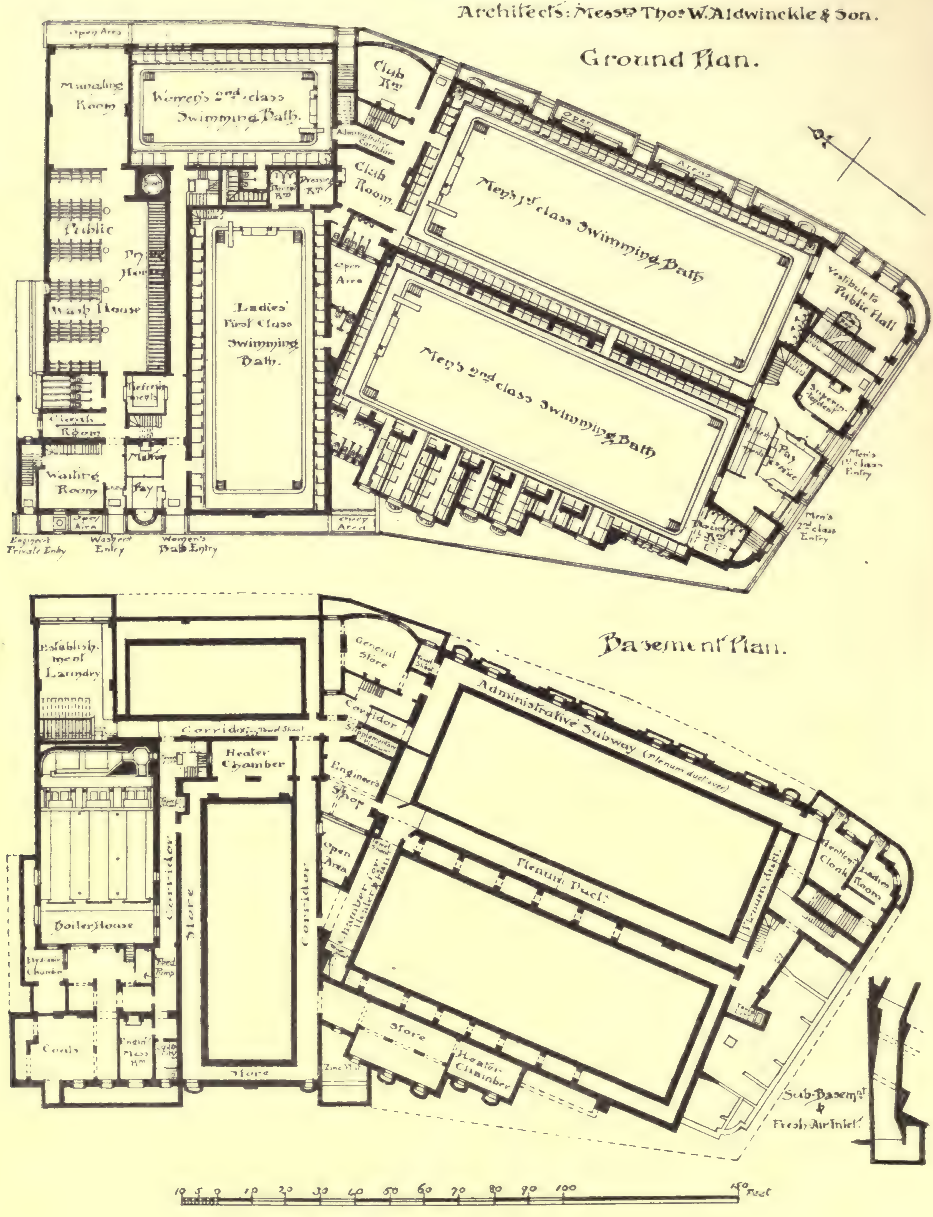
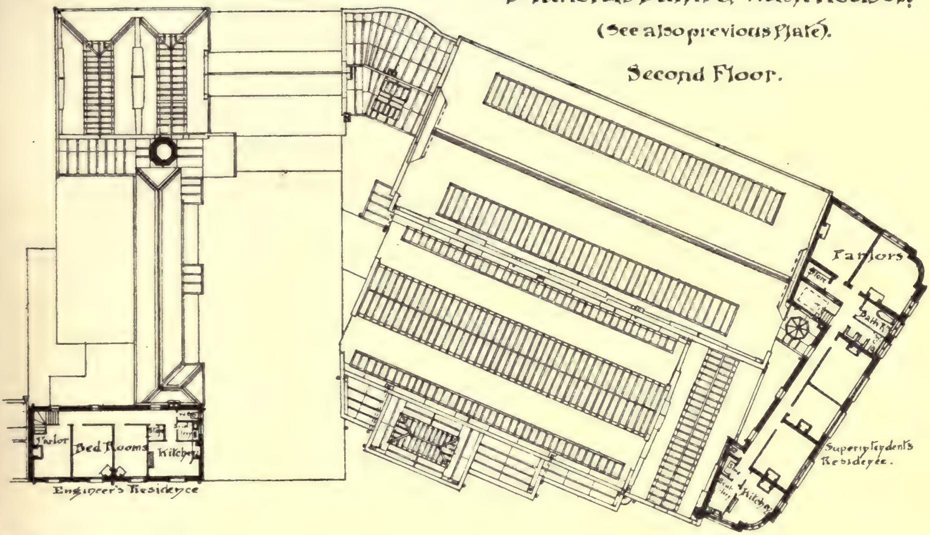


Plate IX.

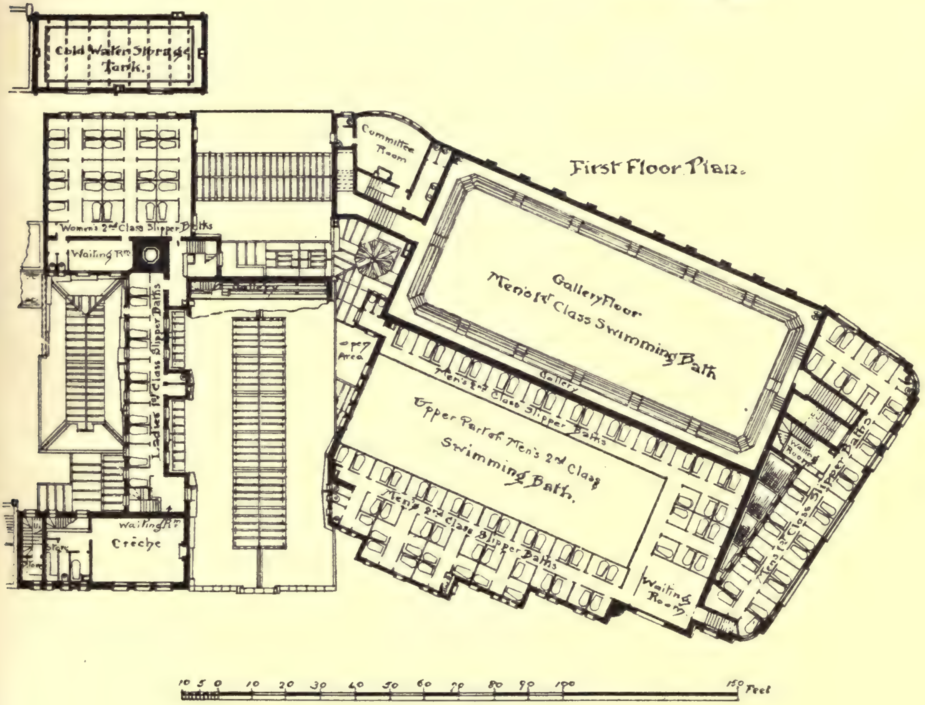
St Pancras Baths & Wash-houses.

(See also previous Plate).

Second Floor.



First Floor Plan.



Cold Water Storage Tank.
Committee Room
Women's 2nd Class Slipper Baths
Waiting Rm
Gallery
Ladies 1st Class Slipper Baths
Waiting Rm
Creche
Store
Gallery Floor
Men's 1st Class Swimming Bath
Men's 2nd Class Slipper Baths
Gallery
Upper Part of Men's 2nd Class Swimming Bath.
Men's 2nd Class Slipper Baths
Waiting Room
Waiting Room
Men's 1st Class Slipper Baths
Area
10 5 0 10 20 30 40 50 60 70 80 90 100 150 Feet

ways to the different-classed baths, and it should be unnecessary to insist upon the absolute separation and privacy of the males' and females' portions of the buildings.

As this work does not purport dealing in detail with any class of building, except so far as principles are concerned, but very few more words are necessary. It may be noted, that there should be adequate supervision throughout.

The administrative portion is well provided for in basement rooms, and it is well to form pipe ducts underneath the gangways of the swimming baths.

The swimming baths may be any convenient size, but by preference may be some multiple of a yard lineal both in length and width, on account of racing contests. The dressing-boxes for men vary from 3 ft. 6 in. square to 4 ft. square; for women, the boxes may be conveniently 4 ft. by 4 ft. 6 in. Side gangways should be not less than 3 ft. 6 in. wide; the end gangways are usually wider, provision being made for a diving-board and stage, a water-chute, &c.

The accommodation for each slipper bath need not exceed 36 ft. super., though such an area is rather restricted and 9 ft. by 8 ft. has been recommended. Soap and douche baths may occupy the size of a dressing-box in the large bath-halls.

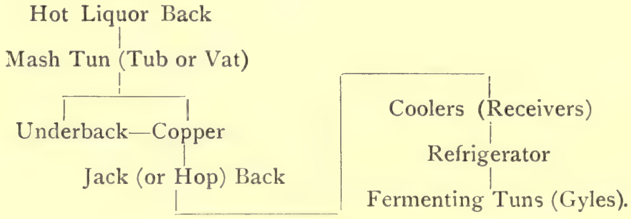
The washing-boxes in the wash-house should each be 3 ft. 6 in. wide by 3 ft. across, and there should be a gangway 6 ft. in width between the sets of compartments.

Turkish baths are now being increasingly provided in public Baths and hotels. The accommodation may include entrance vestibule and hall, apodyterium and frigidarium combined, tepidarium, caldarium, laconicum, labrum, præfurnium (stokery), Safe for valuables. The frigidarium (cooling-room) is often combined with the apodyterium (dressing-room), being divided into bays (12 ft. by 12 ft.), each furnished with four couches, each of these being at least 6 ft. by 2 ft. The doctors, it would seem, do not regard the plunge bath as indispensable. The labrum or lavatorium is for washing purposes and may be fitted with douche baths. When a plunge bath is provided, it would be from 20 ft. to 30 ft. in length by some 7 ft. in width and of shallow depth. See Plates VIII. and IX. for plans of the baths and wash-houses in St Pancras, London, by Messrs T. W. Aldwinckle & Son.

Brewery.—(*a.*) Accommodation according to the size and capacity of the "plant"; plenty of storage; well-water supply desirable; ample space, light and ventilation; room for extensions; aspect; grouping.

(*b.*) Boiler and engine house, tun-room, fermenting-room, refrigerating-room, washing-room (with coppers), workshop, stores, offices, stabling and cart-sheds, sometimes a bottling-room, and frequently a manager's residence. If a "malting" is combined, then barley, hop and malt stores will be required and a malt-kiln also.

In breweries a definite sequence of rooms is requisite, dependent on the various processes in brewing, and this may be understood from the annexed diagram:—



A hoisting apparatus, called "Jacob's Ladder", is frequently employed to carry the malt up to the top of the building at the commencement. From the hot liquor back to the hop back the process is one of gravitation. It is customary to pump the "wort"* thence into the coolers, otherwise the buildings would necessitate being carried to such a height, as would prove inordinately expensive.

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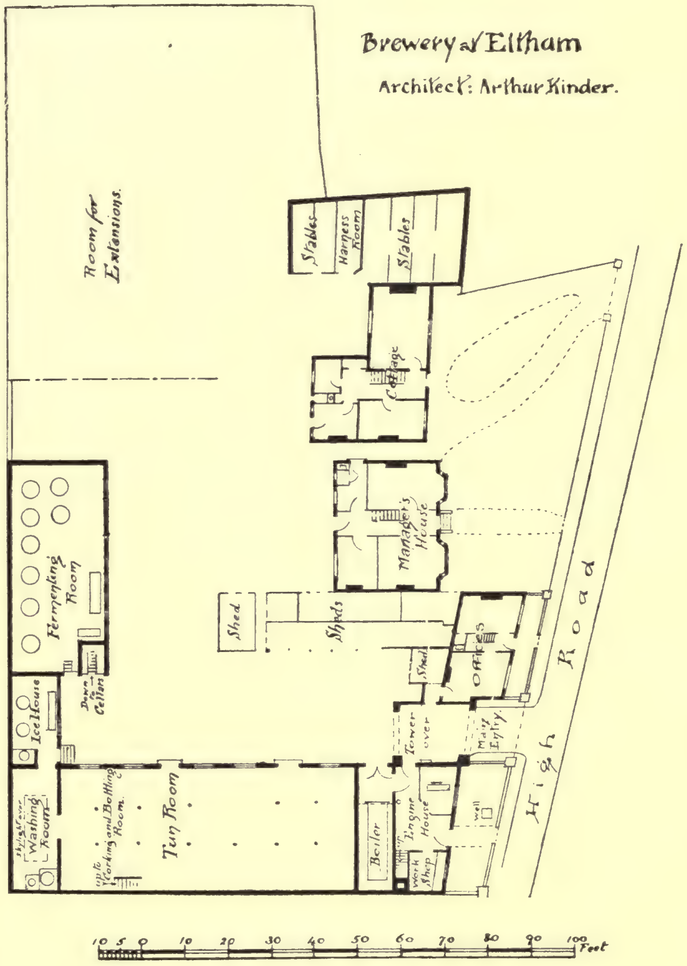
* "Wort" is the new unfermented or fermenting beer.

Plate X

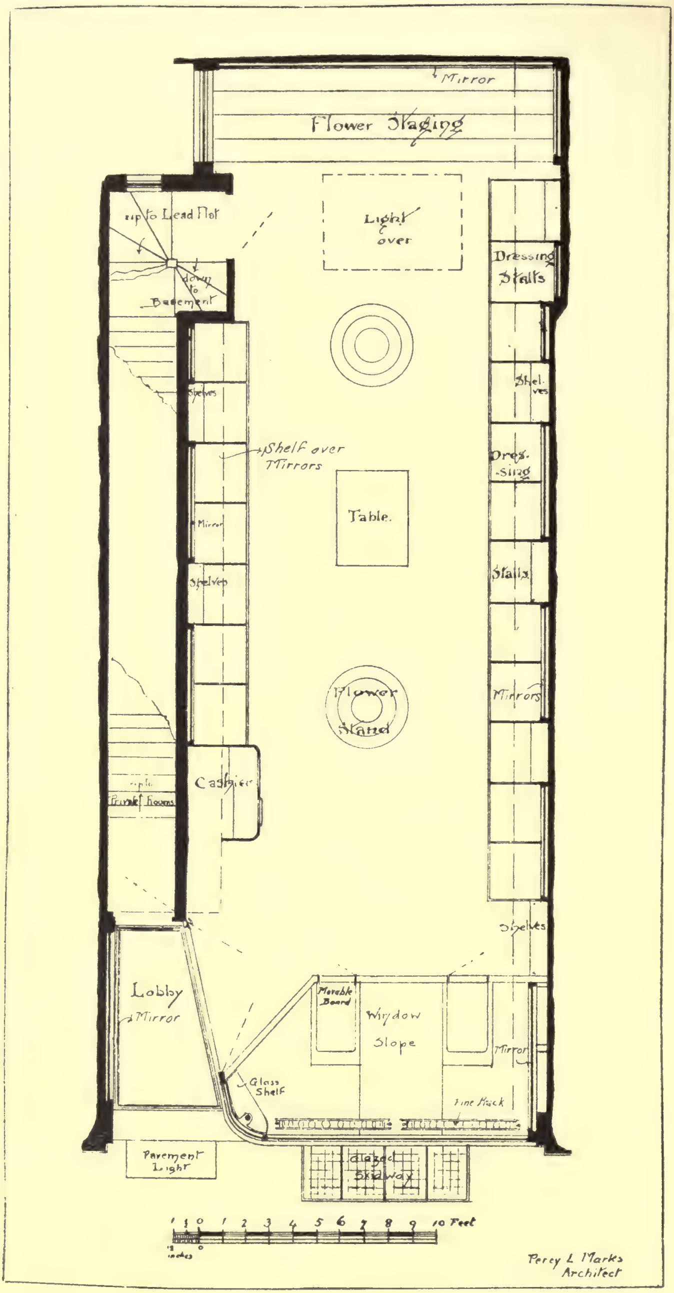


Brewery at Eltham

Architect: Arthur Kinder.

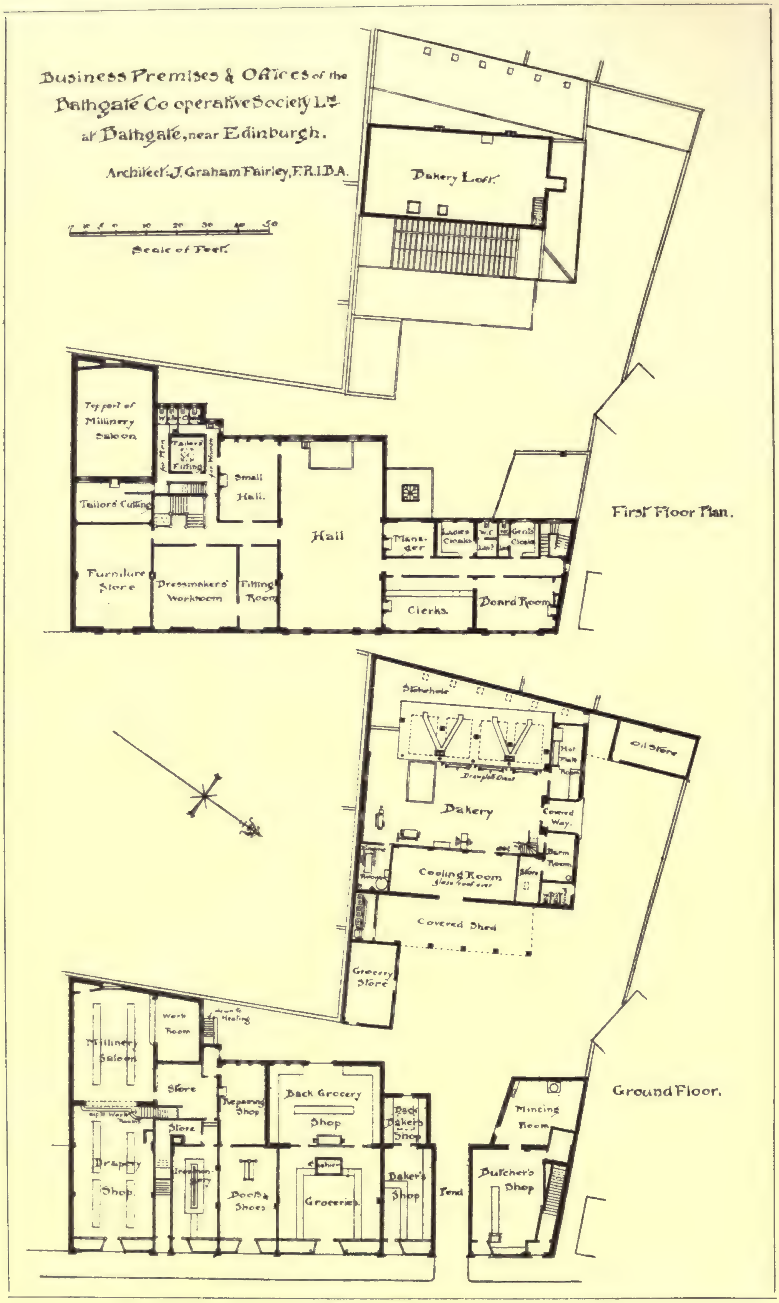
26^2

Plate XI.



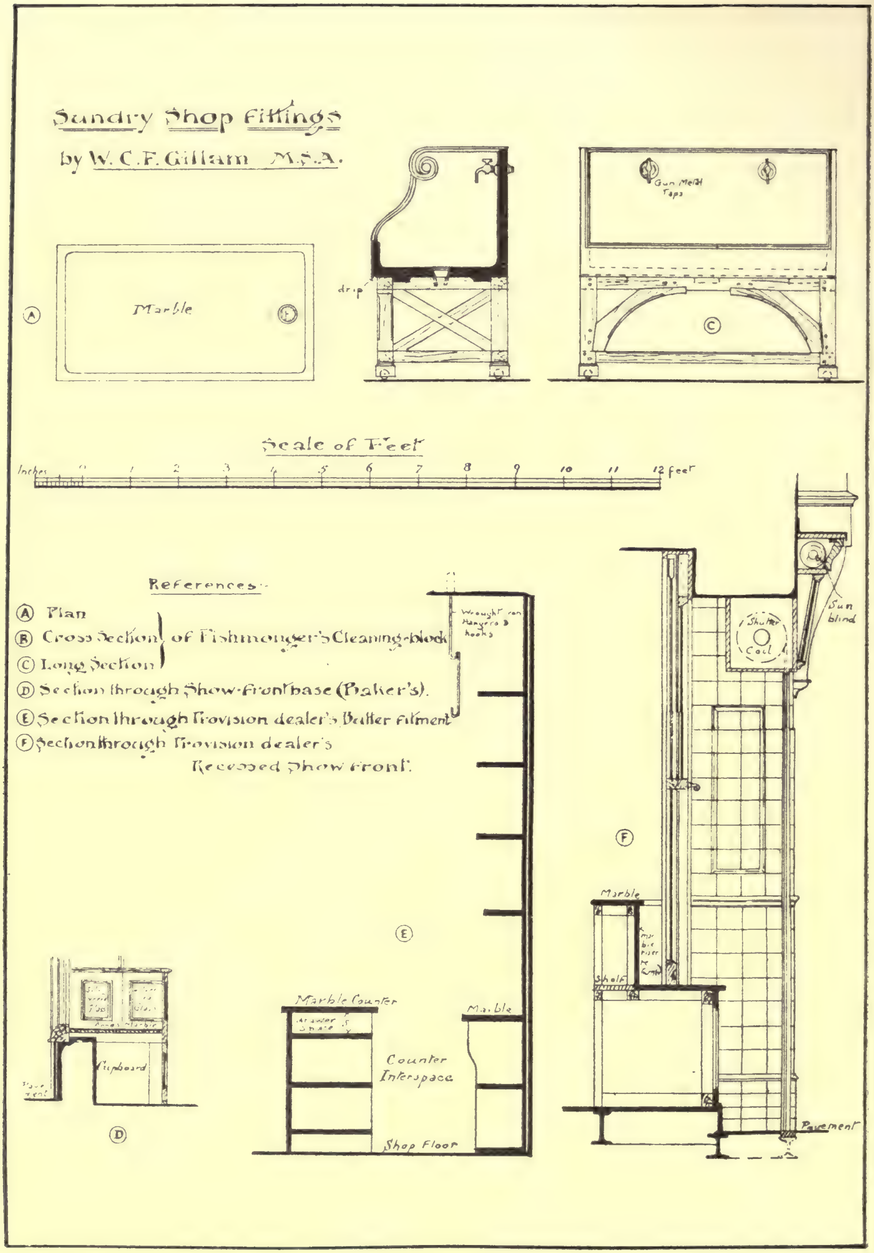
THE FITTING-UP OF A FRUITERER'S SHOP.

Plate XII.


Business Premises & Offices of the Bathgate Co operative Society Ltd at Bathgate, near Edinburgh.
Architect: J. Graham Fairley, F.R.I.B.A.
0 10 20 30 40 50
Scale of Feet.
Bakery Loft
First Floor Plan.
Top part of Millinery Saloon
W.C.
for Men
Tailors' Fitting
for Women
Tailors' Cutting
Small Hall.
Hall
Manager
Ladies Cloaks
W.C.
Lav.
Gents Cloaks
Furniture Store
Dressmakers' Workroom
Fitting Room
Clerks.
Board Room
Stokehole
Oil Store
Hot Plate Room
Drawplate Ovens
Bakery
Covered Way.
Barm Room
Cooling Room glass roof over
Store
Covered Shed
Grocery Store
Ground Floor.
Work Room
down to Heating
Millinery Saloon
Store
up to Workroom
Store
Repairing Shop
Back Grocery Shop
Back Bakers Shop
Drapery Shop
Ironmongery
Boots & Shoes
Cashier
Groceries
Baker's Shop
Pend
Mincing Room
Butcher's Shop

26^4

Plate XIII.


Sundry Shop Fittings
by W. C. F. Gillam M.S.A.
A
Marble
drip
Gun Metal Taps
C
Scale of Feet
Inches 0 1 2 3 4 5 6 7 8 9 10 11 12 feet
References:-
A Plan
B Cross Section
C Long Section
of Fishmonger's Cleaning-block
D Section through Show-Front base (Baker's).
E Section through Provision dealer's Butter fitment
F Section through Provision dealer's Recessed Show front.
Wrought iron Hangers & hooks
Sun blind
Shutter Coil
F
Marble
marble riser to fitment
Shelf
Pavement
E
Marble Counter
Answer Space
Marble
Counter Interspace
Shop Floor
Cupboard
Pavement
D

The old ale gallon was calculated at 282 cub. in. In domestic brewhouses, the copper (brick-set) should be of a capacity to hold at least two-thirds more than the intended quantity of beer. A sketch of a 5-quarter plant Lager brewery by Mr Kinder is given on Plate X.

Business Premises.—(*a.*) Ample light, air and space, good arrangements for display.

(*b.*) The accommodation required may be anything from a mere shop of the smallest dimensions (such as may be seen in the case of No. 2 Parkside, Knightsbridge, in London) through all the intermediate stages up to and including show-rooms (and their accessories), counting-house, store-rooms, packing and delivery rooms, work-rooms, manager's room, &c. &c.—in fact such emporia as Selfridge's (in Oxford St., London), which includes rest-room, reading and writing rooms, post office, telephone exchange, &c.

The requirements varying so widely, it would be impossible in a work of this nature to attempt to illustrate fully the various classes of shop premises ; the example shown on Plate XI. illustrates the fitting-up of a fruiterer's shop. The depth of show-window varies again with the business. In the case of a fruiterer's shop, 6 ft. to 8 ft. is not too much ; a confectioner would require only 2 ft. to 2 ft. 6 in., a chemist the same ; a general draper 5 ft. to 7 ft. or more, &c. &c. It depends naturally upon the manner of dressing the window.

For some trades recessed show-fronts are desirable, so as to provide comfortable standing-room for shop-gazers, thus freeing the general footway from obstruction of this class. This applies particularly to stationers' and booksellers' shops.

" Island " show-fronts are growing in favour.

Within the shop easy circulation and supervision should be provided ; and in large establishments there should be adequate cross-communicating gangways for the use of the public.

On Plate XII. plans of Co-operative stores designed by Mr Graham Fairley are given, and on Plate XIII. some details by Mr Gillam are shown.

The London County Council has made regulations [under the London Buildings Acts Amendment Act, 1905] respecting means of escape from shops exceeding a certain projection beyond the main building, and for buildings generally, exceeding a certain height. This Act should be consulted.

Café.—See under "Refreshment Rooms."

Cattery.—See under "Outbuildings."

Central Station.—See "Electric Power Station."

Chapel and Church.—See "Ecclesiastical Buildings."

Cinematograph Theatre.—See under "Theatre."

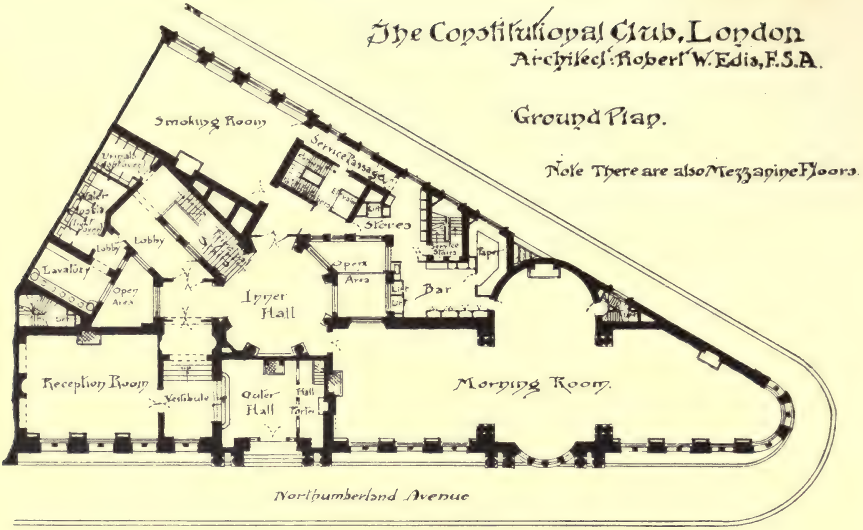
Club-house.—(*a.*) Generous and effective planning, good lighting, kitchen administration.

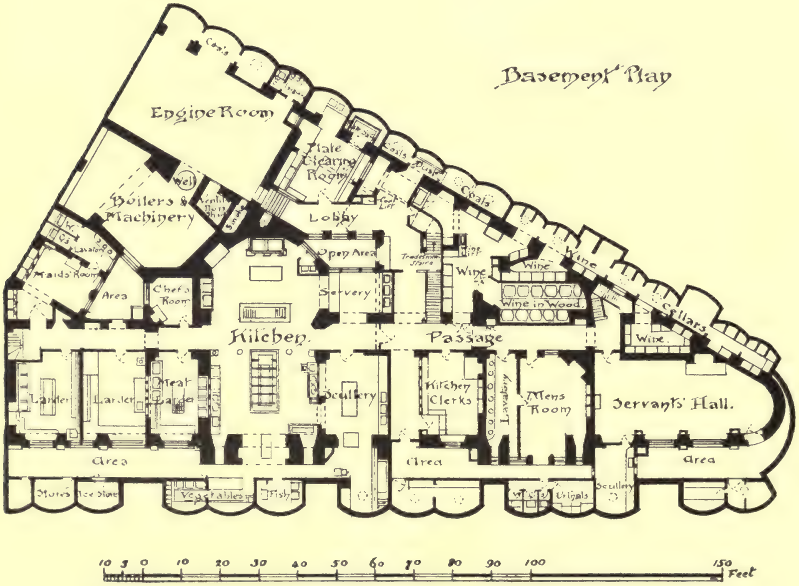
(*b.*) Entrance and inner halls; waiting and reception rooms; cloak-rooms, lavatories, &c.; coffee-room; morning-room; general and members' dining-rooms; billiards, smoking and cards rooms; library; committee-room; secretarial offices; numerous bedrooms, bath-rooms, &c.; kitchen, scullery, servants' hall, chef's room; pantries, larders, stores and cellars of all kinds; lifts, staircases, mess-room; boiler, dynamo and engine houses (the latter if electric current and hydraulic power have to be generated on the premises).

Club-houses are of all kinds, to suit all purposes; but there is one feature in common to all, and that is the recreative. In the case of the houses for the so-called upper and middle classes this feature is all-important, and it is merely a matter of degree, in satisfying its demands.

Club-houses may be broadly classified as non-residential (Salon) and residential Clubs. Of the latter, the Constitutional

Plate XIV.


The Constitutional Club, London
Architect: Robert W. Edis, F.S.A.
Ground Plan.
Note There are also Mezzanine Floors.
Smoking Room
Service Passage
Elevator
Lift
Stores
Service Stairs
Paper
Urinals
Water Closets
Lobby
Lavatory
Lift
Open Area
Principal Staircase
Inner Hall
Open Area
Lift
Bar
Reception Room
Vestibule
Outer Hall
Hall Porter
Morning Room
Northumberland Avenue


Basement Plan
Coals
Engine Room
Plate Cleaning Room
Coals
Dust
Coals
Foot Lift
Well
Boilers & Machinery
Ventilating Shaft
Smoke
Lobby
W.C.
Lavatory
Maids' Room
Area
Chef's Room
Open Area
Servery
Tradesmen's Stairs
Lift
Wine
Wine
Wine
Wine in Wood
Wine Cellars
Wine
Kitchen
Passage
Larder
Larder
Meat Larder
Scullery
Kitchen Clerks
Lavatory
Mens Room
Servants' Hall
Area
Area
Area
Stores
Ice Store
Vegetables
Fish
W.C.
Urinals
Scullery
10 5 0 10 20 30 40 50 60 70 80 90 100 150 Feet

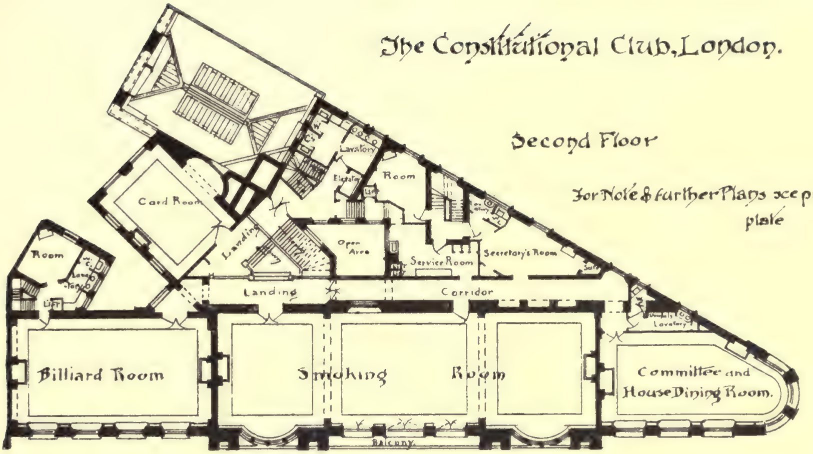
28²

Plate XV.

The Constitutional Club, London.

Second Floor

For Note & further Plans see previous plate



First Floor.

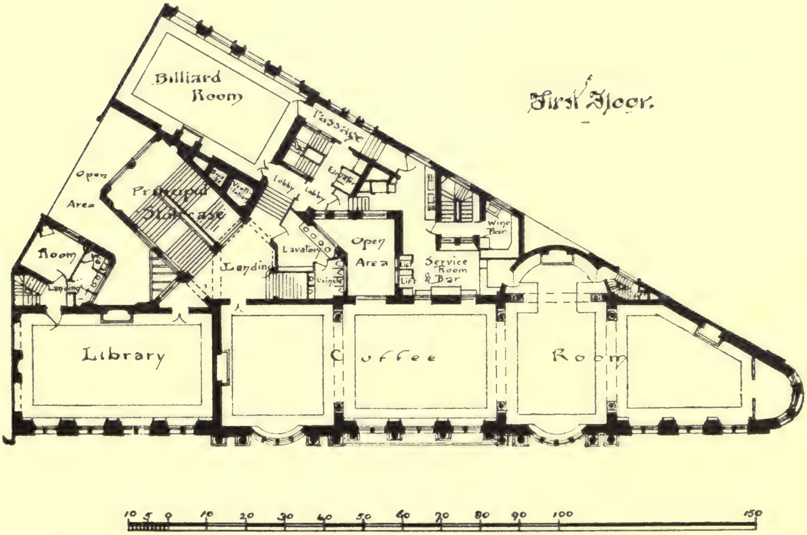
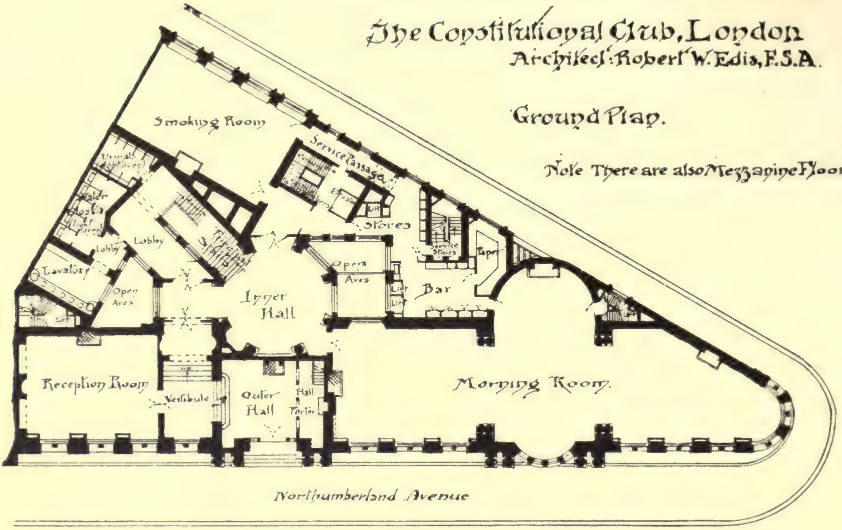


Plate XIV.

The Constitutional Club, London
Architect: Robert W. Edis, F.S.A.



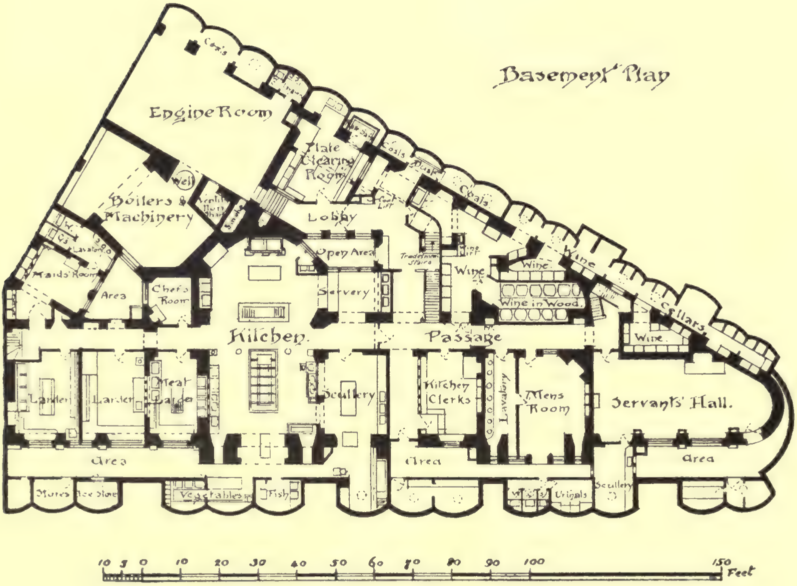
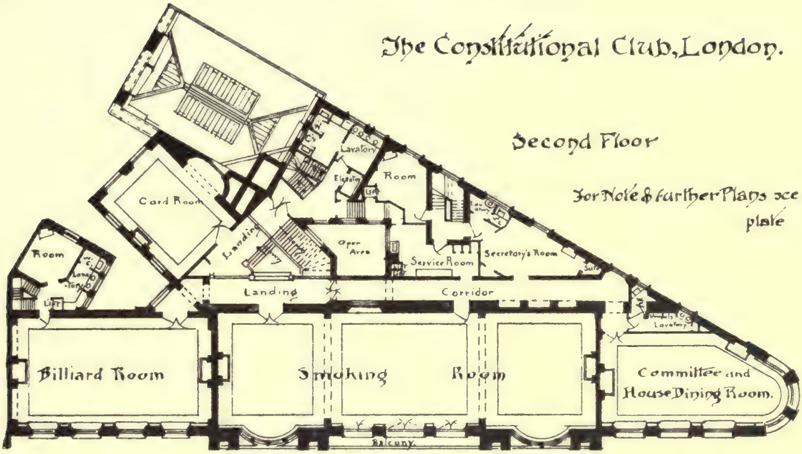


Plate XV.

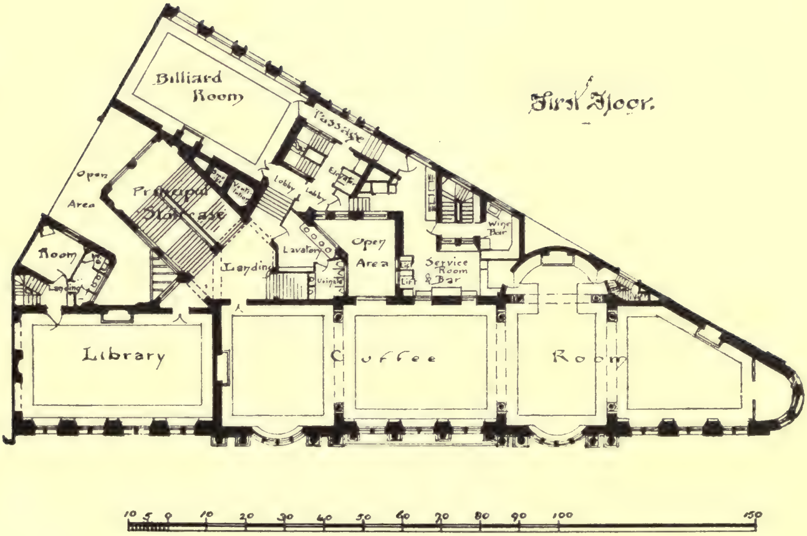
The Constitutional Club, London.

Second Floor

For Note & further Plans see previous plate



First Floor

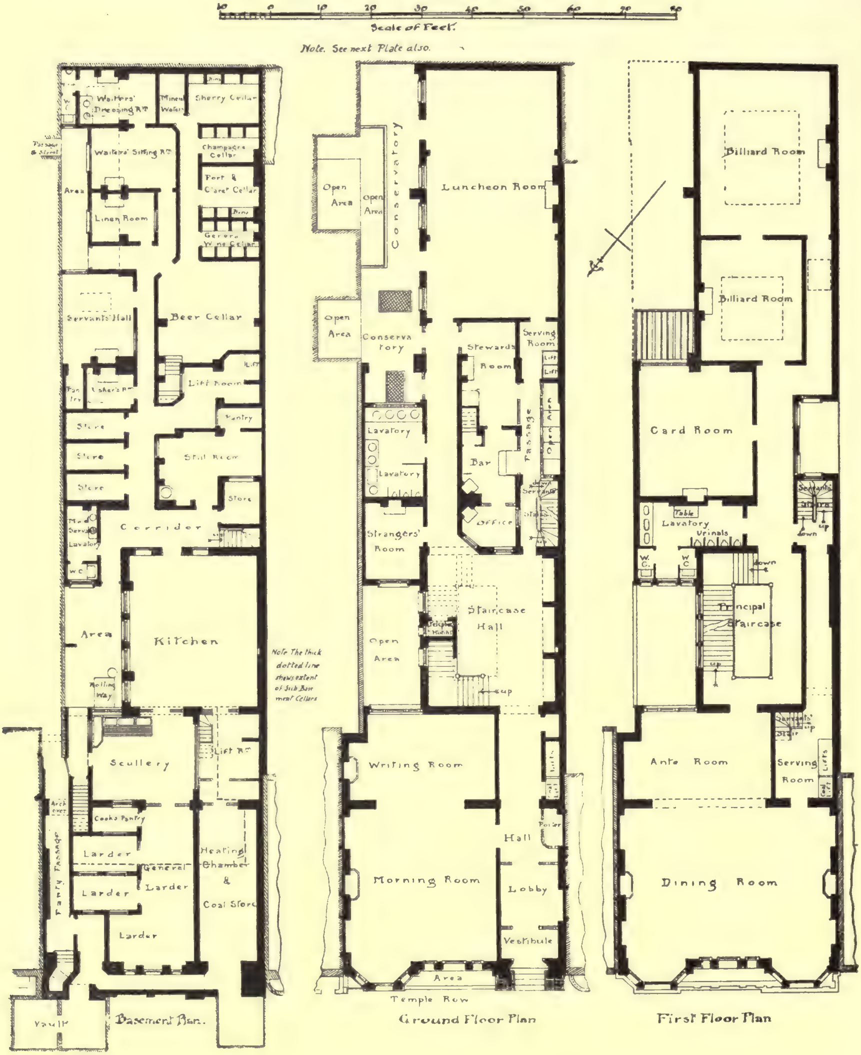


28^3

Plate XVI.

The Conservative Club: Birmingham.

Architect Frank B. Osborn, F.R.I.B.A.



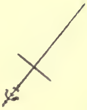
Basement Plan.

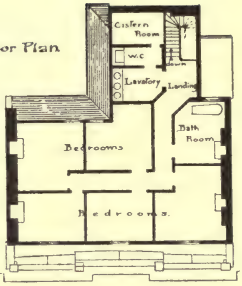
Ground Floor Plan

First Floor Plan

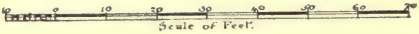
Plate XVII.

Fourth Floor Plan



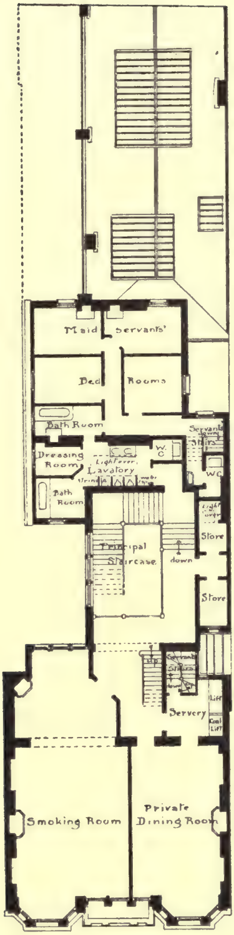


The Conservative Club: Birmingham.

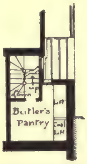


Scale of Feet.

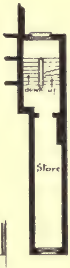
Note. See previous Plate also



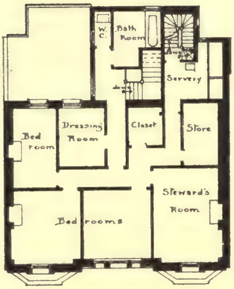
Second Floor Plan.



Mezzanine Plan between 1st & 2nd Floors shewing Butler's Pantry.



Mezzanine Plan between First & Second Floors shewing Store Room.



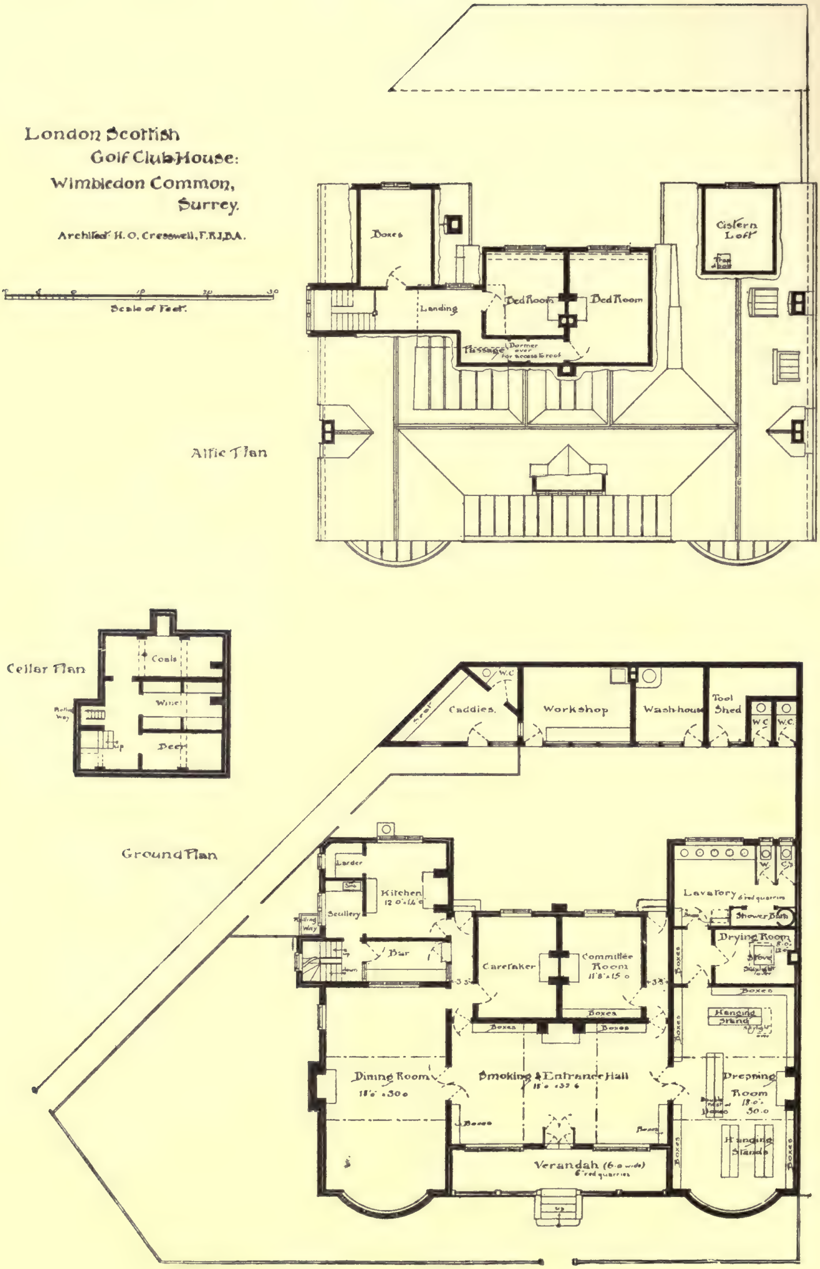
Third Floor Plan.

28^{5}

Plate XVIII.

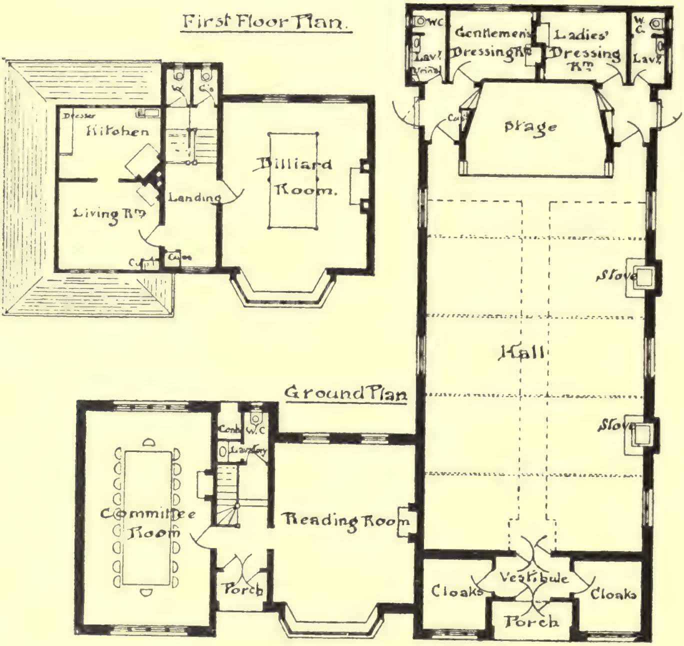
London Scottish
Golf Club-House:
Wimbledon Common,
Surrey.

Architect: H. O. Cresswell, F.R.I.B.A.



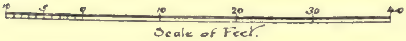
28^6

Plate XIX.



Proposed Village Hall & Club: Byfleet.

Architects: W. F. Taylor & Son, A.R.I.B.A.



Club, London, is a good example, though the bedroom floors are not of sufficient general interest for illustration within; the plans shown on Plates XIV. and XV. are those carried out by Mr R. W. Edis between twenty and twenty-five years ago.*

Salon Clubs, such as the Travellers', the Service Clubs, &c., in London, do not need to be shown here, as the social and domestic portion of the Constitutional Club will adequately serve for the purpose of illustration. On Plates XVI. and XVII., however, are shown plans of a provincial Club-house, designed by Mr F. B. Osborn, in which building the residential feature is very little in evidence.

The distinctions attaching to various Clubs, whether political, sociological, social, scientific or otherwise, do not to any appreciable extent affect the planning, and consequently need no further comment here.

There are other Clubs, however, whose planning is very considerably modified as a result of their particular requirements.

Sports Club-houses, such as for Angling, Yachting, Shooting, Golfing, &c., are satisfied with much simpler accommodation. As an example, a Golf Club-house in Surrey, designed by Mr H. O. Cresswell, is illustrated on Plate XVIII. It will be observed, how very little variety of accommodation is needed in such a house, and it is of interest to note the special requirements in lockers, caddies' room, &c. Yachting and Rowing Club-houses would as a rule have a boat-house as an integral portion.

Village Clubs are small establishments, generally having a lecture and entertainment hall attached. The accommodation required may be reading and billiards rooms, refreshment bar, committee-room, W.C.'s, lavatories and cloak-room, public hall with platform, vestibule and entrance hall with pay-box, artistes' rooms, gallery to public hall, &c.

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* Alterations since effected have resulted in the first-floor billiards-room being converted into a private dining-room, a new billiards-room being built over the latter at the second floor level. Also the coffee-room balcony has been transformed into an integral portion of the coffee-room.

Plans for such a building, submitted in competition by Messrs W. F. Taylor & Son, are shown on Plate XIX. The hall was planned to accommodate 150 persons.

When Working-men's Clubs are under consideration, the recreative aspect is still much in evidence; but a large hall is a not infrequent provision, where lectures with limelight illustrations can be given, thus serving the purpose of pleasing the men with the effects, whilst allowing them liberty to ignore the solid portion of the entertainment. Clubs for working lads and girls make a distinct feature of the educational side; these establishments are primarily for the elevation of the "working classes" (to use the customary but inept phrase), the method being to commingle serious study and pleasing relaxation. Remarks on the sociological results are not in place here; it suffices to note, that the accommodation required will be class-rooms (whose number will vary according to the necessities of each Club) a large hall for lectures and entertainments, cloak-rooms, reading-room and tea-room, and a committee-room should also be provided, placed near the large hall, and thus able to act also as the artistes' retiring-room. The seating arrangements in the large hall should not be fixtures, but merely loose furniture, and by preference chairs not forms. Panic exits should be a provision; not that the numbers in the building would be often extensive, but at times there would be special gatherings of the members and their friends, and on these occasions experience has demonstrated the wisdom of having extra exits.

Coach-house.—See under "Outbuildings" (Stables).

Commercial and other Offices.—(*a.*) Good lighting of corridors and staircases; avoidance of trivial alterations in level of any single corridor; numerous (in preference to spacious) offices.

(*b.*) Single rooms and suites; if for a large business may include manager's, secretarial and clerical offices, and sometimes a Board-room; waiting and telephone rooms, W.C.'s and lavatories, and perhaps rooms for hats and coats.

Concert Hall.—(*a.*) The requirements for artistes and audience; natural lighting, acoustic requirements, adequate entrances and exits, accommodation for organ and orchestra.

(*b.*) Auditorium and platform, organ, entrance-hall, pay-box, tiers, crush-room, cloak-rooms, lavatories, &c., saloon bars, artistes' rooms, stores, caretaker's rooms.

In a large hall, the accommodation required consists principally of a repetition of some of the above requirements. The basis of accommodation is as for theatres. See also under Appendix B. for the London County Council Regulations for the metropolis.

A width of not less than 2 ft. 6 in. between rows should be allowed for the choir and not less than 3 ft. for the orchestra.

The platform of a concert hall is a simple provision, vastly differing from the stage of a theatre. There are no traps, sliders, or cuts required, nor does the floor need to be laid to a fall. Footlights, too, should be avoided. Space for an organ of large capacity should be provided.

Respecting the satisfaction of acoustic requirements, reference is to be made to the chapter dealing with this so-called science—in reality a nescience, however paradoxical that may sound. Here it will suffice to quote M. Guadet, "No one knows anything about it, and the results obtained are unfortunate. It is true that there is no lack of very learned treatises on the subject (of acoustics), but as they arrive very learnedly at diametrically opposite conclusions, they annul one another, so that there remains nothing"—in fact, one is fain to recall the Kilkenny feline contest.

Coroner's Court.—See under "Mortuary."

County Court.—See under "Assize Courts."

Cow-house.—See under "Outbuildings."

Crematorium.—(*a.*) Statutory distance from dwellings and public highways; open and well-elevated site; grouping.

(*b.*) Chapel with catafalque; waiting-room, vestry, incinerating chamber, columbaria, chimney-shaft and tower.

The Act regulating cremations is of the 3rd Edw. VII.; amongst other regulations, it provides that crematoria shall not be erected within 200 yards of any dwelling, unless with the written consent of the lessor, the lessee, and the occupier for the time being; nor shall they be within 50 yards of any public highway.

The chapel or cremating-hall should be of any area from 600 ft. upwards (Hull having a chapel 24 ft. square, and the City of London at its Ilford crematorium having a chapel 24 ft. by 25 ft.), but most of the existing buildings provide more generous accommodation. The incinerating chamber should not be less than 20 ft. by 25 ft. for one furnace; but provision for two or more furnaces is the rule.

The catafalque averages in its dimensions 12 ft. by 3 ft. 8 in. by a height of 4 ft., the aperture at the head of same for the passage of the coffin being about 2 ft. 9 in. high and of the same width as the catafalque; this aperture should be fitted with iron doors and draped over by a curtain on the face towards the chapel. The coffin is mechanically conveyed from the catafalque to a lorry inside the furnace-chamber, and thence deposited in the furnace.

The chimney-shaft should be 60 ft. to 80 ft. or 90 ft. in height, and not less than 2 ft. square internal measurement at the base. A tower will form a pleasing screen for the shaft. Two varieties of receptacles for the ashes are in vogue: (1) the "box," 1 ft. 4 in. by 8 in. by 8 in. high, and (2) the "vase," 10 in. to 12 in. diameter by 1 ft. 6 in. high; the latebræ or niches should be capable of receiving from three to five urns each, and provision should be made in a crematorium for the storage of any number of urns from 1,500 to 4,000 or 5,000.

Cycle-house.—See under "Outbuildings."

Dairy.—(*a.*) Aspect, constant temperature, ventilation, seclusion from "conveniences."

(*b.*) Milk-room, scalding-room, pressing-room, churning-room, scullery, cheese-making room, drying-room, storing-room, lavatory (but not water-closets, &c.).

The amount of accommodation varies, of course, with the nature or extent of the work performed. Frequently the dairy consists merely of a room attached to the domestic offices, but where the processes are to be carried out on an extended scale, then it should be a detached building. A dresser 2 ft. wide on three sides of the dairy, to hold the pans, is desirable, a length of shelf of about 15 in. sufficing for the milk of each cow. The entrance to the milk-room should be through a lobby, not less than 3 ft. deep. In any case, water-closets and such-like should be kept well removed from the process-rooms and stores, and by preference should not be provided in the detached building. Sizes of rooms cannot well be given, everything depending upon the required accommodation. A verandah is advisable for protecting the vessels, when drying on benches in the open air. A lavatory basin with hot and cold supply should be provided in a separate apartment in the building, and a cloak-room is also requisite. The building must be most efficiently ventilated. Bye-laws made under the Public Health Acts of 1875 and 1891 are issued for the regulation of public dairies in the extra-metropolitan and metropolitan areas respectively.

Dining-rooms.—See under "Refreshment-rooms," &c.

Ecclesiastical Buildings.—(*a.*) The requirements for ministration and congregation; efficient side lighting, acoustic requirements, symmetry, orientation.* It must also be remembered that Roman Catholic and Jewish fanes must be schemed with a view to processions as part of the ritual. Facilities for the free movement of communicants have to be considered.

(*b.*) The accommodation required in a Protestant Church may be nave, aisles, transepts, chancel and sanctuary, sacristy, vestries (with safe and cupboards), galleries, organ chamber, baptistery, morning chapel, cloak-rooms, lavatories, heating chamber, &c.

Though a baptismal font is a requisite, it is not always placed in a baptistery. Cathedrals are to a great extent magnified churches; but there is additional accommodation in chapter-house, residences in connection, &c. &c.

A church designed by Mr G. H. Fellowes Prynne, F.R.I.B.A., is shown on Plate XX.

(*b.*) The accommodation required in a Roman Catholic Church may consist of all the provisions just mentioned, and, in addition, there must be "saints' chapels," "confessional boxes," and presbytery.

One of Mr Goldie's church plans is illustrated on Plate XXI.

A greater proportional space at the altar is wanted in these churches, as there are more individuals taking part simultaneously in the conduct of the service. Confessional boxes may be single (say 3 ft. by 3 ft.) or double (3 ft. by 4 ft. 6 in. with two wings, each 1 ft. 6 in. by 3 ft.).

(*b.*) A Nonconformist Chapel may consist merely of nave and (perhaps) galleries, with a vestry, heating chamber, &c. It may be elaborated, as is frequently the case with Wesleyan and other chapels.

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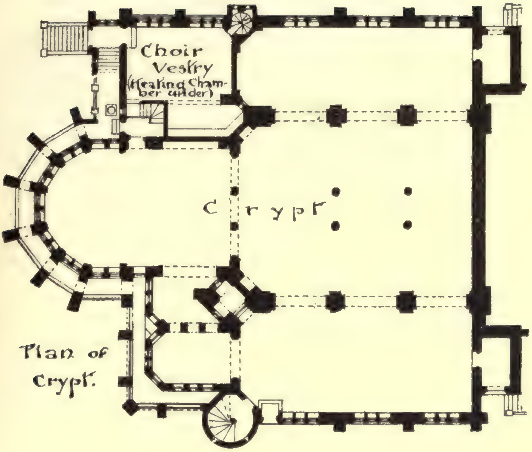
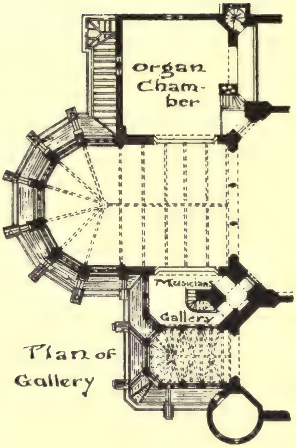
* Orientation seems to be much less considered in places of worship nowadays than it was in former times.

Plate XX.



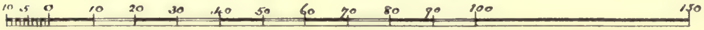
Plan of Crypt.



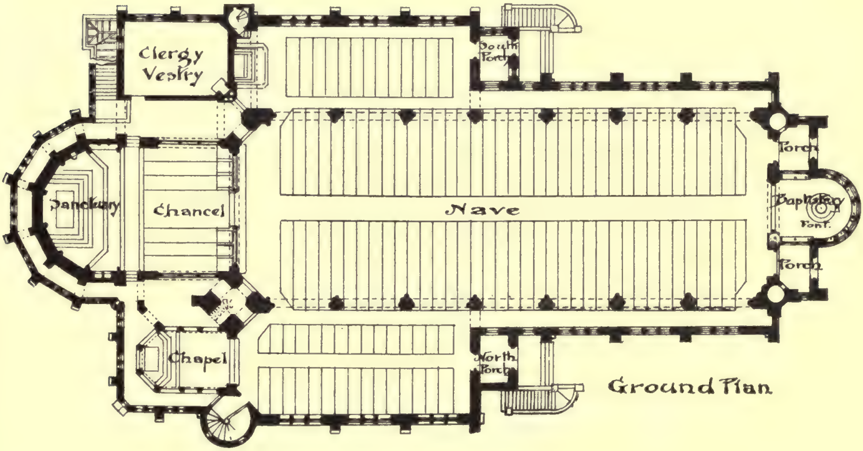
Plan of Gallery

All Saints' Church: West Dulwich.

Architect: G. H. Fellowes Prynne, F.R.I.B.A.



Scale of Feet.



Ground Plan

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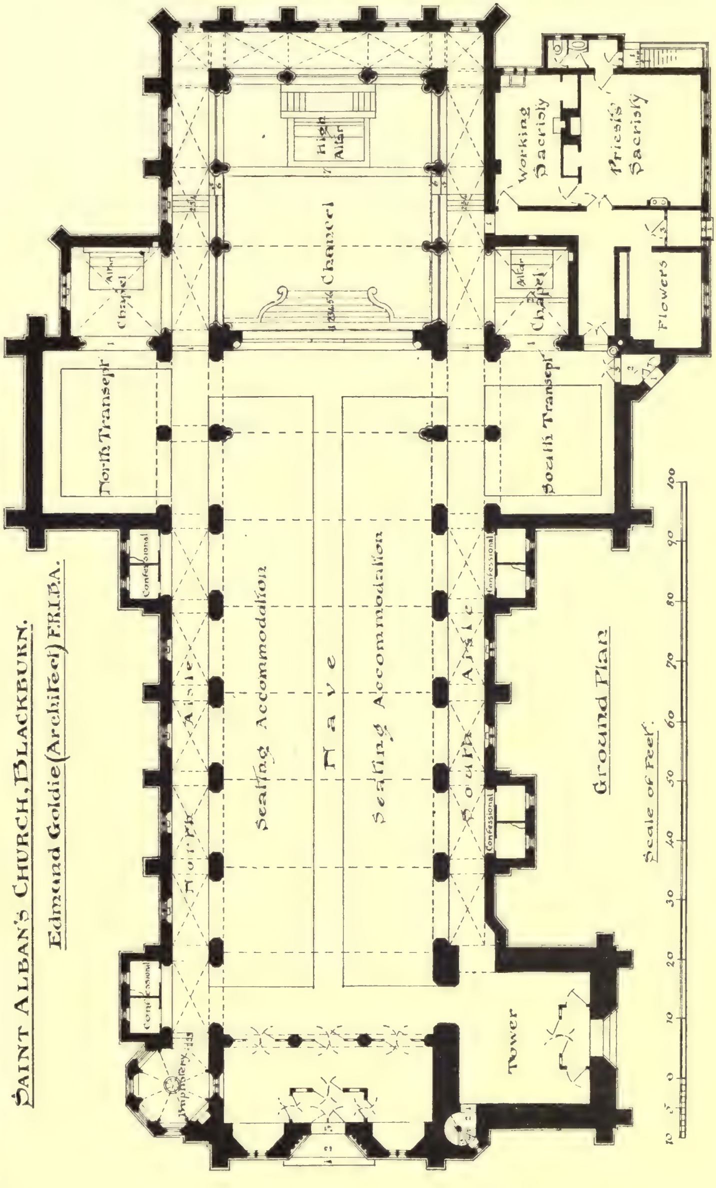
Plate XXI.



Roman Catholic Church plan

SAINT ALBAN'S CHURCH, BLACKBURN.

Edmund Goldie (Architect) F.R.I.B.A.

Plate XXII.

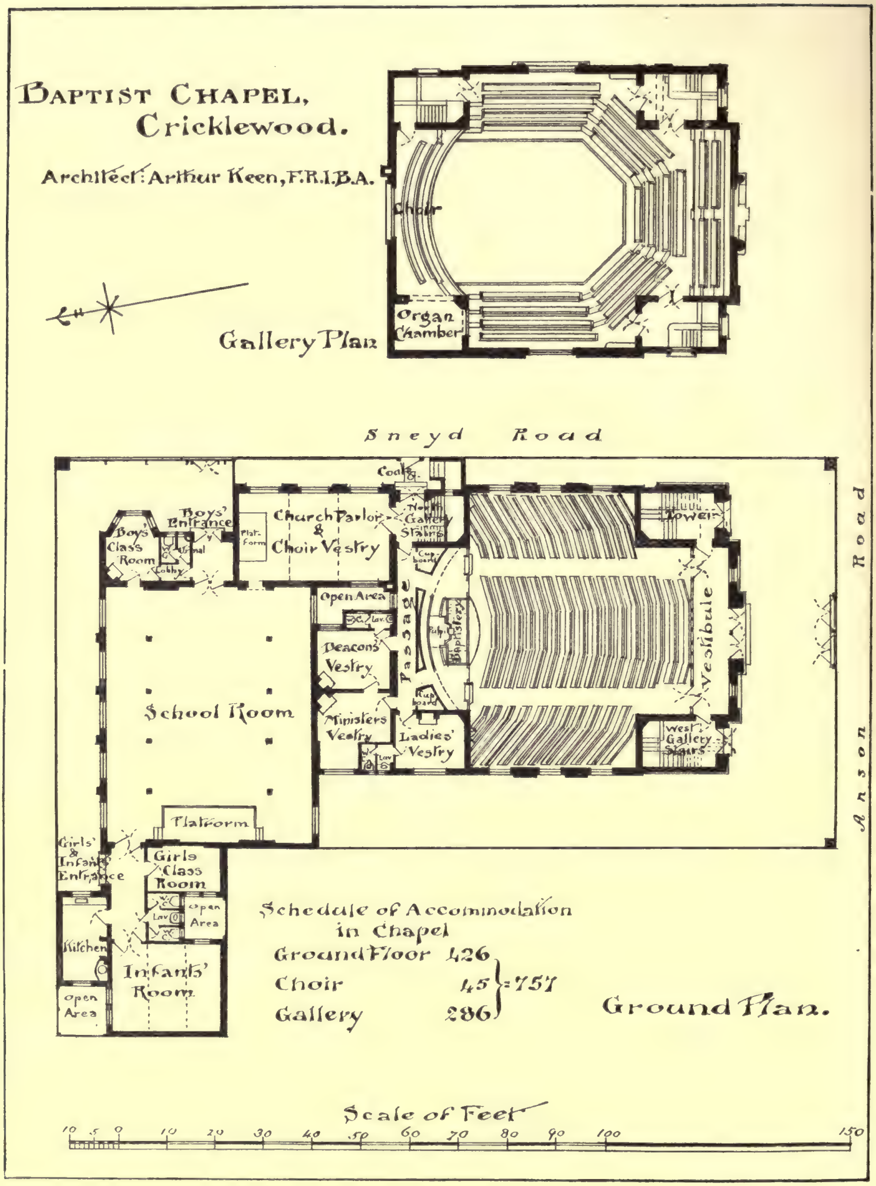
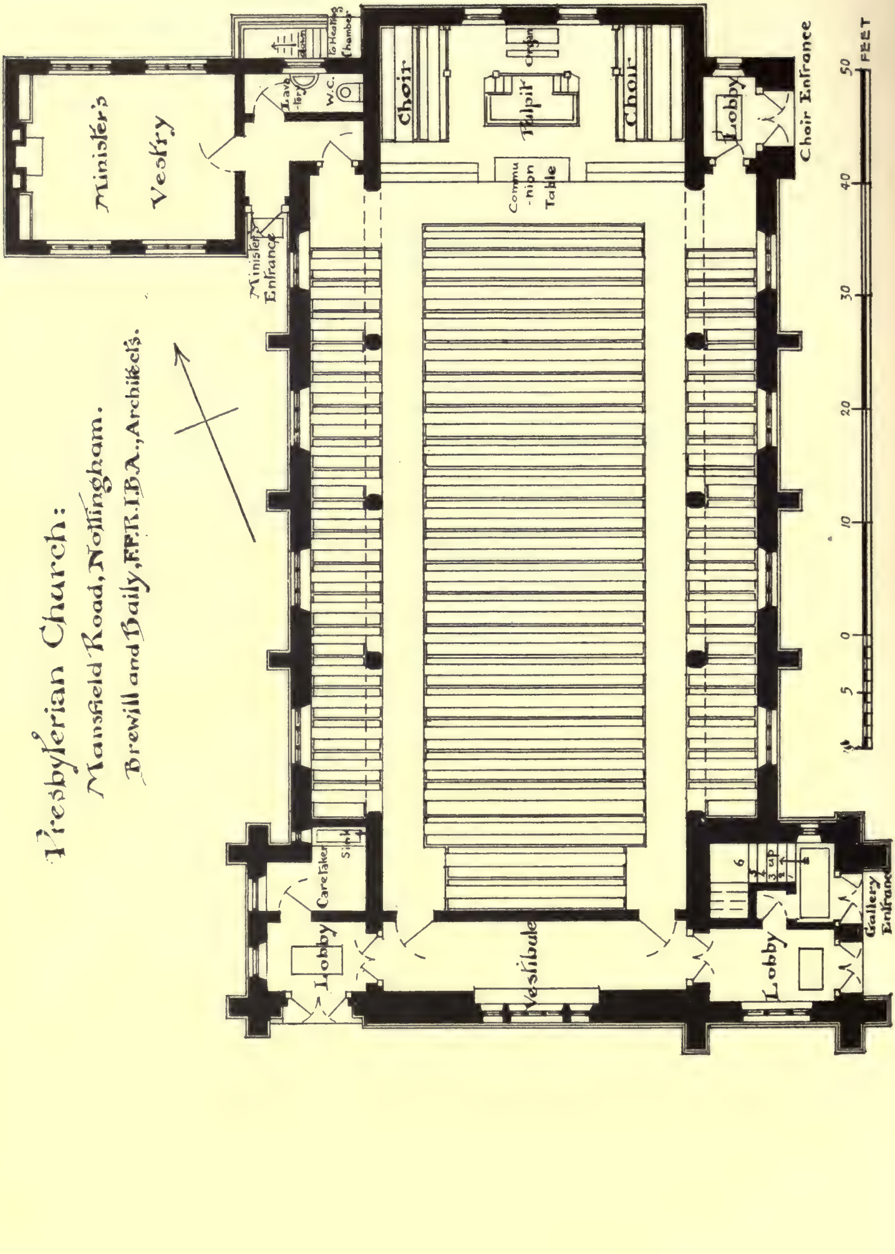

BAPTIST CHAPEL,
Cricklewood.
Architect: Arthur Keen, F.R.I.B.A.
Gallery Plan
Choir
Organ Chamber
Sneyd Road
Anson Road
Coals
Church Parlor & Choir Vestry
Plat-form
North Gallery Stairs
Tower
Boys' Entrance
Boys' Class Room
Urinal
Lobby
Cup-board
Open Area
Lav.
Passage
Pulpit
Baptistery
Vestibule
Deacons' Vestry
Ministers' Vestry
Ladies' Vestry
West Gallery Stairs
School Room
Platform
Girls' & Infants' Entrance
Girls' Class Room
Open Area
Kitchen
Infants' Room
Open Area
Schedule of Accommodation in Chapel
Ground Floor 426
Choir 45
Gallery 286
= 757
Ground Plan.
Scale of Feet
10 5 0 10 20 30 40 50 60 70 80 90 100 150

Plate XXIII.



Presbyterian Church: Mansfield Road, Nottingham. Brewill and Baily, FF.R.I.B.A., Architects.

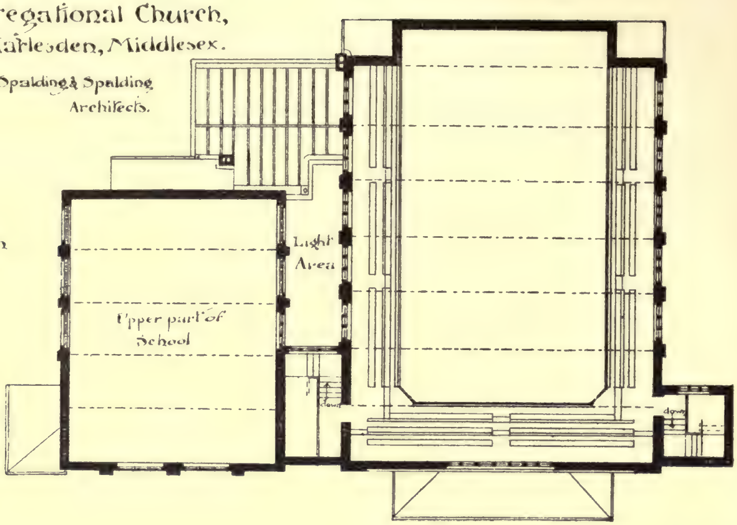
$34^{\bar{5}}$

Plate XXIV.

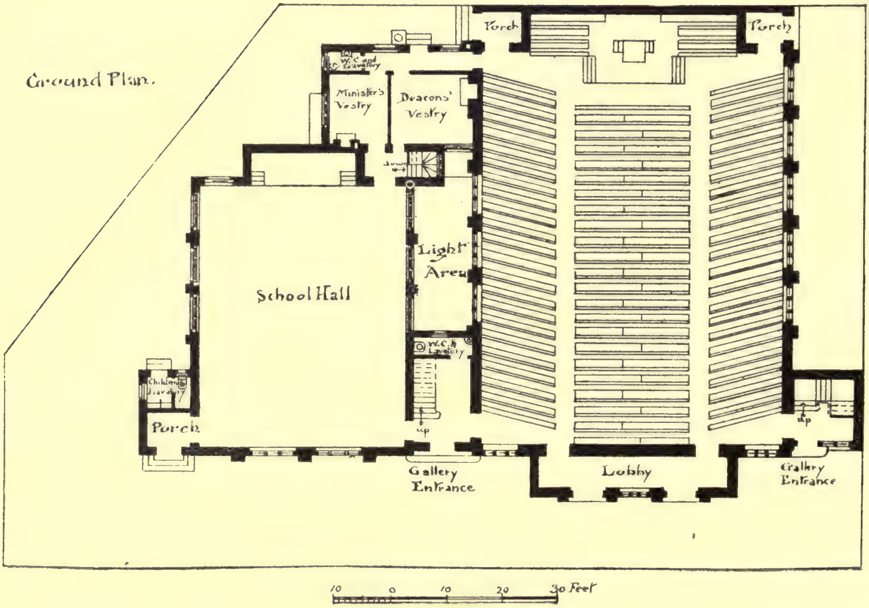
Congregational Church, Harlesden, Middlesex.

Messrs. Spalding & Spalding
Architects.

Gallery Plan



Ground Plan.



The varieties of Nonconformist edifices are indefinite, though perhaps not infinite. A mere parallelopiped satisfies the requirements of some of the three hundred and odd sects that make up the religious communities of this sphere. Examples of various Nonconformist places of worship are shown on Plates XXI. to XXV. Mr Arthur Keen (the architect of the building shown on Plate XXII.) has very kindly contributed some notes on Baptist chapels, which are given in Appendix K (p. 269).

The basis of accommodation is the space requisite per individual member of the congregation, and this has been calculated and regulated by the English Church Commissioners (for places under their authority) at not less than 1 ft. 8 in. by 2 ft. 10 in. per sitting; for free places they allow 1 ft. 8 in. by 2 ft. 3 in.; these are for adults. For children, they allow 1 ft. 2 in. by 2 ft. 3 in. The first dimension in each case is the width, and the second is the clear distance between one pew-back and another. If chairs are used, a calculation of 7 ft. super. each, inclusive of use of gangway, should be allowed.

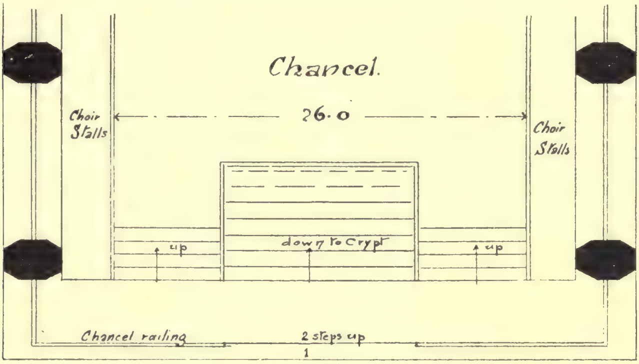


FIG. 8.—SKETCH OF CHANCEL.

The Communion Table, Altar or Holy Table* varies considerably in dimensions. The "mensa" or upper slab is found in lengths varying from 3 ft. to 13 ft.; the depth from front to back should be not less than 2 ft., thus admitting the use of a corporal 1 ft. 8 in. square.

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* Evangelicals and Nonconformists usually call these Holy (or Communion) Tables; High Churchmen and Roman Catholics habitually call them "Altars."

Morning chapels are growing in favour, and are provided with a communion table.

The special requirements of the different rituals must be fully attended to. In some sects, ritual is conspicuous by its absence, and a mere nave should suffice to answer the purposes of a meeting-house. In cathedrals, crypts are frequently met with, and have their uses both hygienically and ritually ; a crypt chapel is not infrequent ; here was often set the sarcophagus of the person, to whom the fane was erected. Where a crypt is desired, it can be effectively entered somewhat as in Fig. 8.

St Etheldreda's, off Holborn (London), is a two-storeyed church, the crypt with its altar at the west end, and the upper church with the usual east-end altar ; this is an instance of unusual planning, the approach by way of a side cloister being perhaps unique, but not desirable for imitation.

(*b.*) A Synagogue requires for ritual purposes a Reading Forum ("Al Memar"), "ark," choir seats (as a rule), wardens' pew, pulpit and vestry. Other requisite accommodation consists of pews for the congregation (for men in the body of the building, and for women in the galleries), cloak-rooms, lavatories, &c., entrance hall, heating chamber.

A "Succah"* has to be borne in mind when planning the synagogue ; this is only required for use during one week in each year. Committee and class rooms and beadle's residence are also frequent provisions.

The congregation should be slightly benefited in accommodation beyond the dimensions given elsewhere for church and

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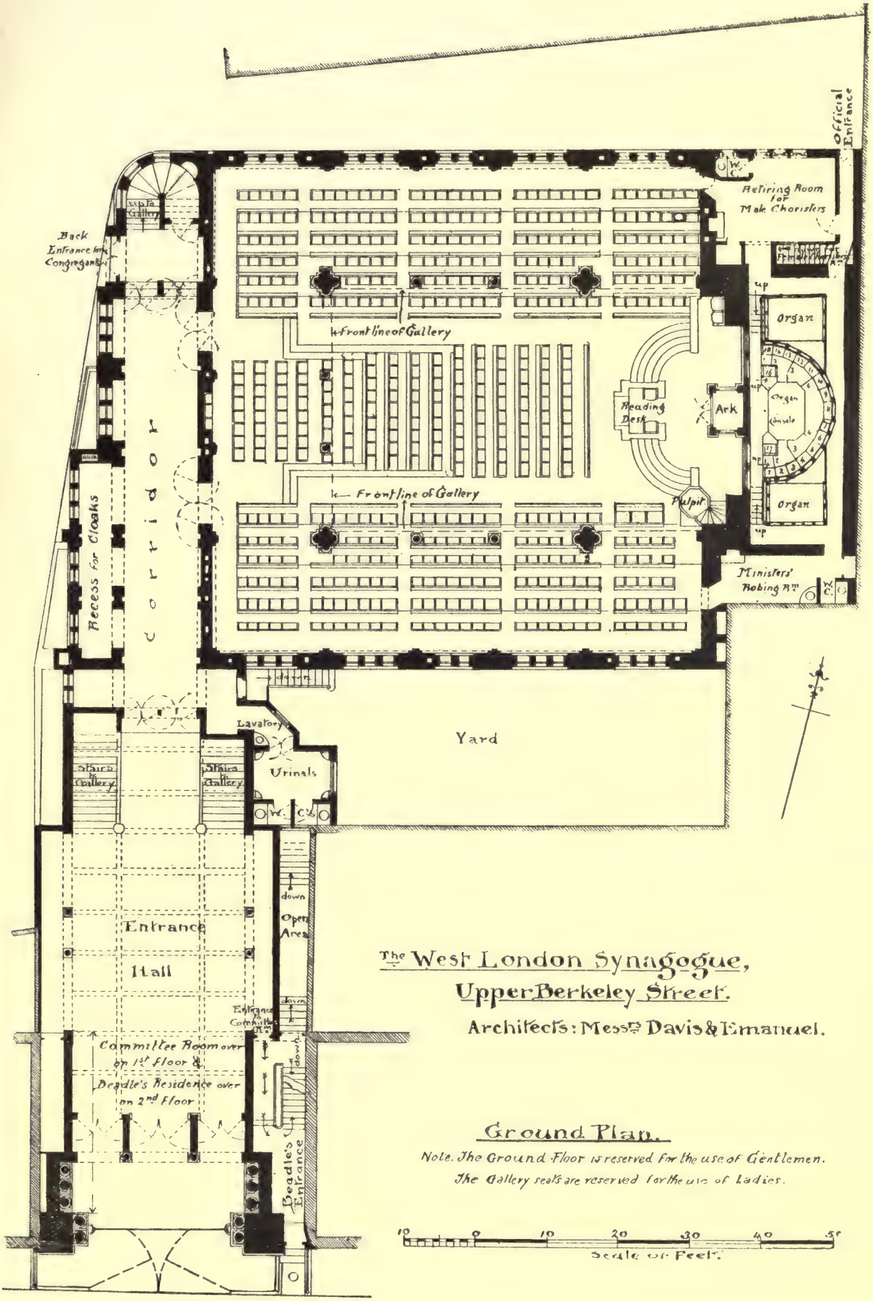
* A "Succah" is a chamber or enclosure commemorative of the booth-dwellings of the Israelites during their forty years' sojourn in the Wilderness. It must be provided with a section of moveable roof.



The West London Synagogue, Upper Berkeley Street.

Architects: Messrs Davis & Emanuel.

Ground Plan.

Note. The Ground Floor is reserved for the use of Gentlemen.
The Gallery seats are reserved for the use of Ladies.

chapel sittings, as there is apt to be more perambulation on the part of individuals, due to their active participation in the ritual. 1 ft. 8 in. by 3 ft. should be the minimum for the unit of pewing.

The Jewish ritual necessitates the segregation of the sexes, and this is met by installing women in the galleries, as they have not any such active participation in the service as noted above. The best position for the choir is still debated in Jewish circles. The matter cannot be so easily decided as in Christian places of worship, as it is customary for Jews to dispense with instrumental music. The "Al Memar" should be of a size to accommodate the Reader and some six to eight people in addition, and is fitted with a reading-desk and seats; it is usually raised 3 ft. to 3 ft. 6 in. above the nave, but at times the "Al Memar" is on the level, and the congregational seats are raised.

The "ark" usually assumes the form of an enclosed shallow recess at the extreme end of the synagogue (usually and by preference the eastern end). It is intended for the reception of the "scrolls of the Law"—seven or eight or more in number.

It is customary to provide an entrance hall, which is a distinctly useful feature and gives an air of completeness to a building of this class; cloak-rooms, lavatories, gallery stairs and (frequently) a vestry open off this hall.*

The Synagogue illustrated on Plate XXV., though not typical from the orthodox Israelite's standpoint, is full of interest and information.

Electric Power Station.—(*a.*) Proximity to rail, canal or river, good approach by road, adequate space for extension of site, level site.

(*b.*) Engine-house, boiler-house, store-houses, mess-rooms, offices, chimney shaft, water-tower, pump-room, accumulator room, workshops, car-sheds, caretaker's rooms, &c.

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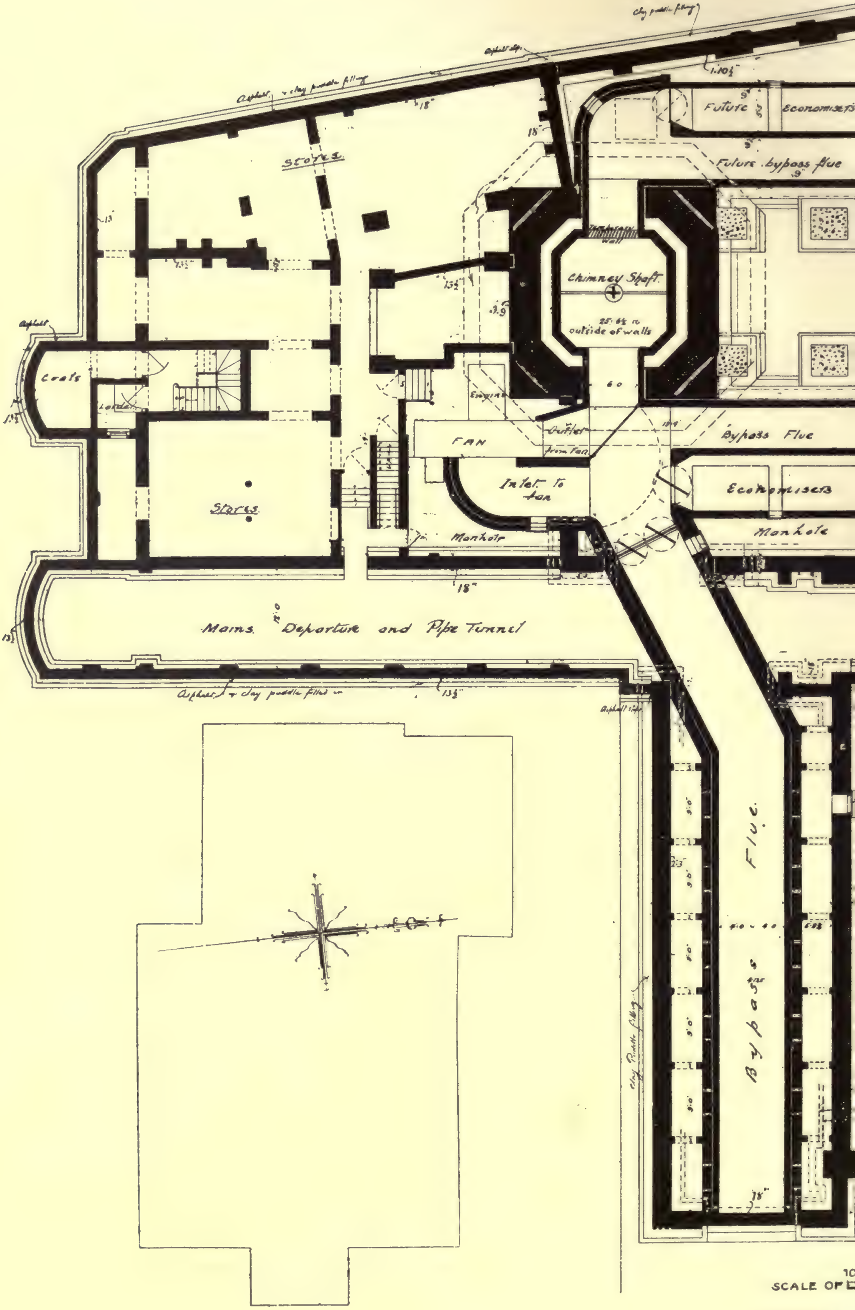
* For rules affecting staircase planning in metropolitan buildings of this class, see Appendix A.

The provision of Central stations (for this is the generic name by which they are known) is one in which the combined services of architect and engineer are requisitioned. The two chief purposes for which these stations are erected are, of course, for the generation of electricity either for (1) lighting or (2) tram traction, or more frequently for both purposes. There are other uses, but they are more in the nature of adapting existing means to possibilities, such as dust-destroying, artificial stone manufacture, &c. The introduction of dust-destructors has this interesting feature worthy of notice, namely, that the heat, engendered by burning communal refuse, aids in the provision of steam for working the engines, which in their turn work the electro-producing dynamos, and these very dynamos provide the power for working the dust-destructors. It is a modern instance of the mystery attaching to the hen and the egg, that is to say, which initiates the generation, the dust-destructor or the dynamo?

It is not possible here to give detailed particulars of requirements in a Power Station. In each case it will be necessary for the engineer to determine what available power there must be in every twenty-four hours, namely, the quantity required for lighting and for traction; and he also will determine (as between himself and the architect, that is to say, for there will be a committee with whom he will previously consult) the nature of the supply, whether high or low tension, alternating or direct current, the kind of boiler, engine and dynamo to be employed, the method of boiler-feeding and all such interesting points. It will be for the architect to provide a building to suit these requirements and conditions, and his experience will prove valuable in the matter of grouping the accommodation and in specifying and superintending the construction.

An important point to bear in mind is, that whatever plant is laid down should not be required to be disturbed for future extensions; and these extensions should also be considered, by the construction of those portions of the future requirements in flues and underground conduits which, if not constructed with the original work, would necessitate some disturbance of the latter



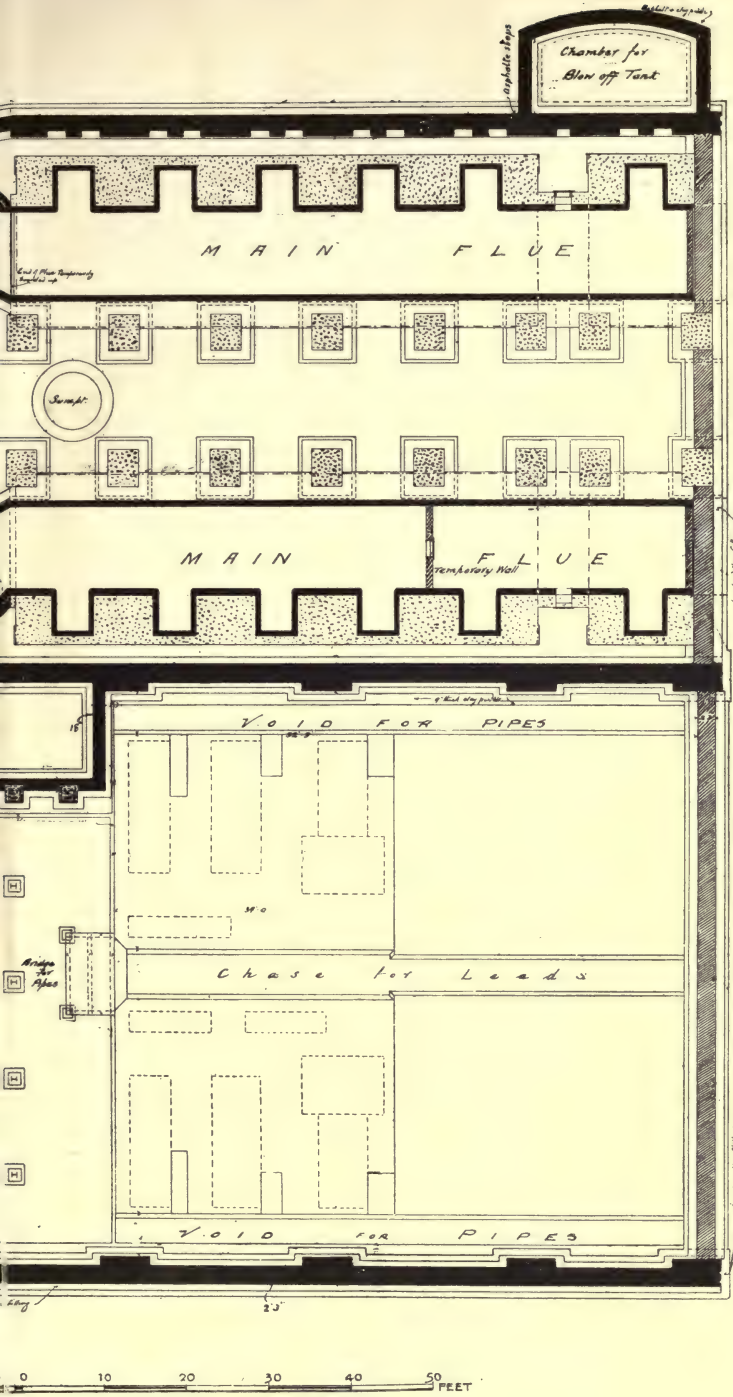
BASEMENT

BATTERSEA BOROUGH COUNCIL E

Engineer—A. M. Kennedy, M.I.C.E.

[*See also the next two Plates.*]

Plate XXVI.

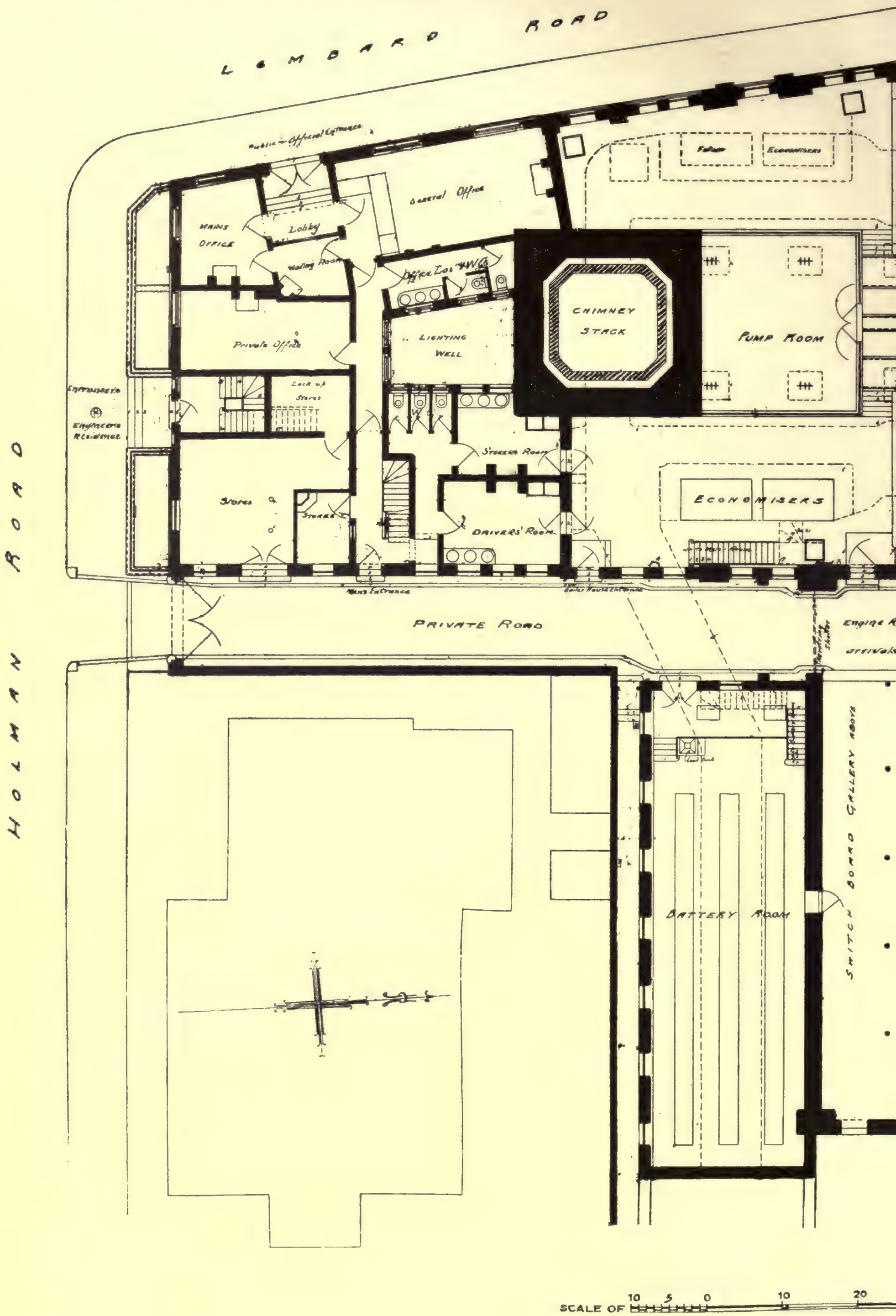


(TRIC GENERATING STATION.

Architect—C. Stanley Peach, F.R.I.B.A.

[*Between p.* 38 *and Plate XXVII.*

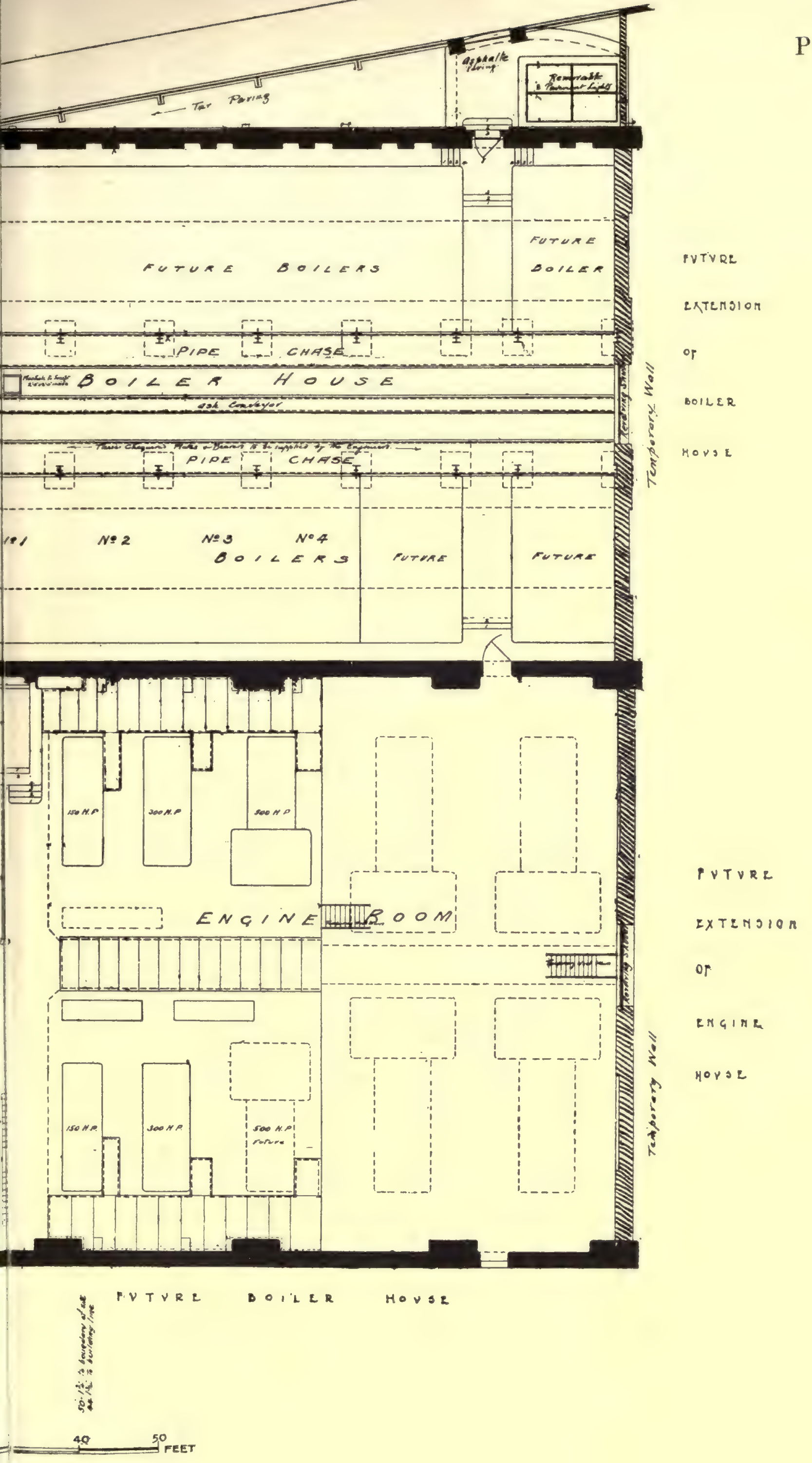
38^3



GROUND PLA

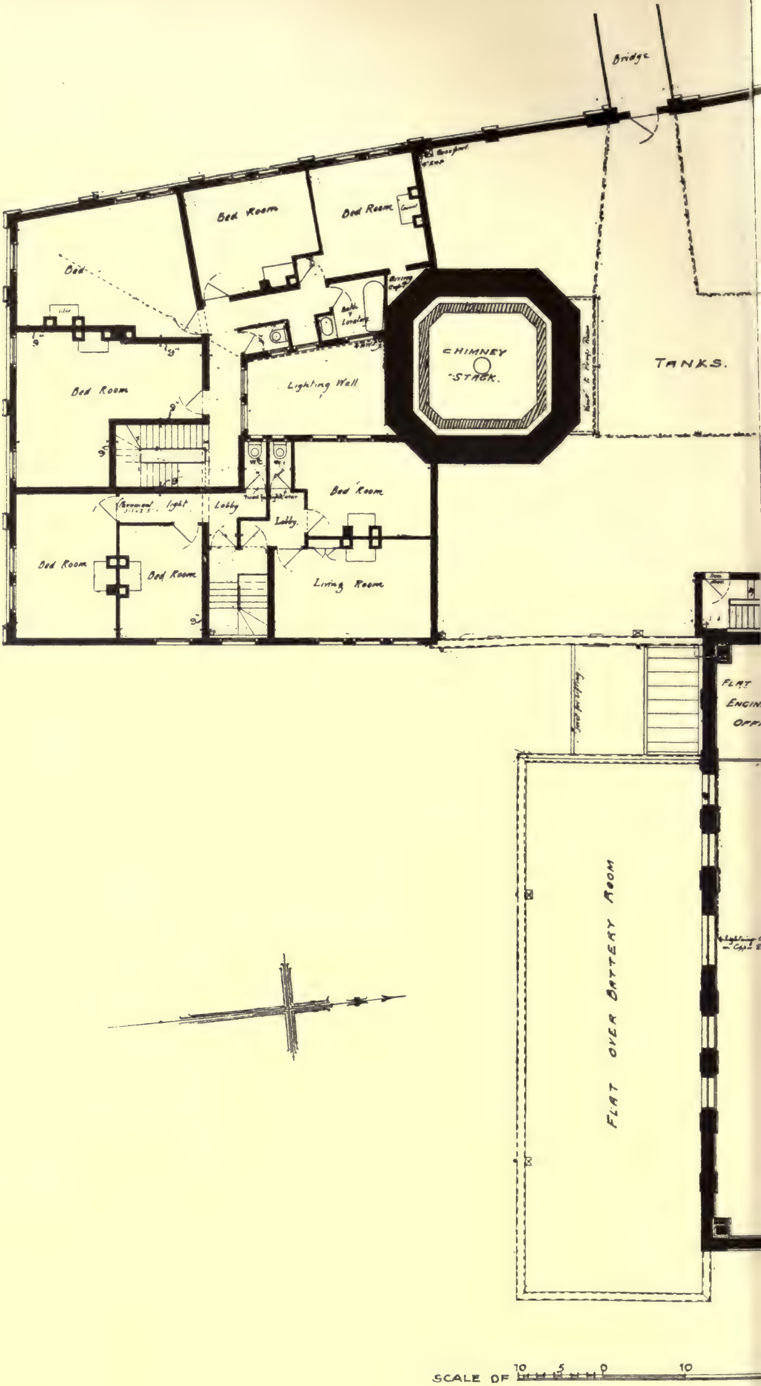
BATTERSEA BOROUGH COUNCIL ELE

Plate XXVII.



RIC GENERATING STATION.

38^{5}

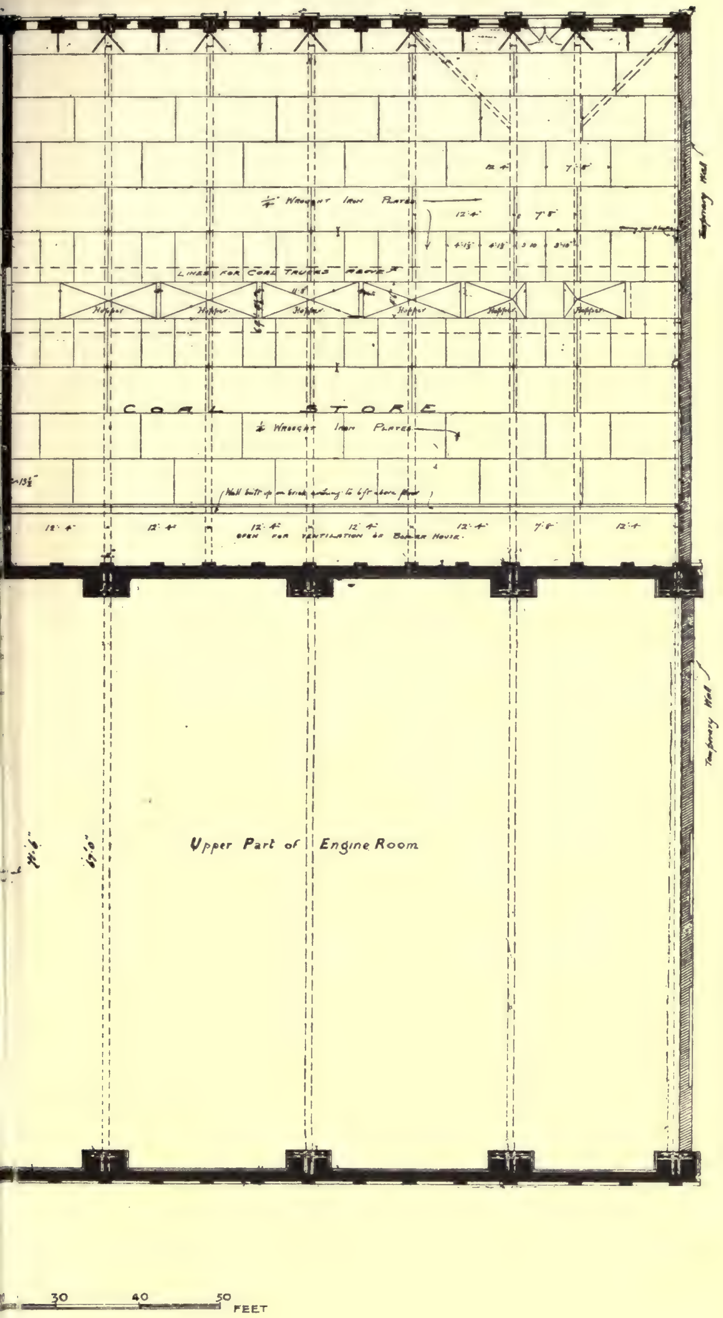


FIRST FLO

BATTERSEA BOROUGH COUNCIL

[See also the preceding two Plates.]

Plate XXVIII.



AN.

CTRIC GENERATING STATION.

[*Between Plate XXVII. and p.* 39.

for the extension. The effects of vibration, resulting from the use of powerful engines, must also be borne in mind, the concrete bedding and foundations generally being adapted to specific requirements.

There is considerable difference of opinion as to the kind of boiler to be used, whether the Lancashire, the water-tube or other type: similarly with engines, whether they shall be vertical or horizontal.

All these points and others render anything like definite information a matter for the moment of decision; nor is there anything to be gained by giving typical dimensions; but a study of Plates XXVI., XXVII., and XXVIII. will be valuable as showing the results obtaining from the combined efforts of architect and engineer.

Embassy, &c.—(*a.*) Spaciousness and stateliness; grouping, prospect, aspect, symmetry.

(*b.*) As a rule some existing mansion or house is adapted and reserved for the purpose, the requisite accommodation and dignity varying with the importance of the office. A consulate would be merely an ordinary office suite.

Exchanges.—(*a.*) Plentiful and unobstructed accommodation, good light and ventilation and acoustic properties, easy approaches and good entrances and exits.

(*b.*) The "house," exchange hall or "market" (sometimes both general and special); call-porters' boxes, entrance vestibules, halls, staircases and lifts; board (or committee) room; secretary's and clerks' offices; clearing house; telephone rooms, post office, telegram boxes, telegraph instrument room; sale rooms, show-rooms, stores and strong-rooms; restaurant or luncheon room, smoking and reading rooms; clerks' and messengers' rooms; lavatories and cloak-rooms; caretaker's apartments, &c.

The species of Exchange will, of course, dictate how much of the above accommodation is necessary. A bankers' exchange will not require much of the above; commercial exchanges, on the other hand, should be well detailed, some classes requiring stalls and good diffused lighting for the exhibit of samples. The "house" should be kept well away from the chances of easy access by unauthorised persons, and should be as acoustically satisfactory as possible. It should be of large area, from, say, 75 ft. to 100 ft. in length by 50 ft. or upwards in width. Large blackboards should be fixed on one wall of the "house" for quotations to be marked. The number of telephone rooms should be generous.

Factory.—(*a.*) Adequate side-lighting, efficient provision of panic exits, sanitary requirements, avoidance of open staircase-wells.

(*b.*) Workrooms varying in size and number with the nature of the manufacture; stores, W.C.'s, lavatories and cloaks, delivery and packing rooms, manager's room, office, &c. Perhaps also boiler and engine houses and lifts may be required. In the metropolis, the Hydraulic Power Company provides the requisite power for lifts, &c. on these and other business premises. Electric lifts are also frequently met with.

The Factory Acts impose certain restrictions in regard to these buildings. See extracts given in Appendixes F. and G.

Fire-Brigade Station.—(*a.*) Direct communication with good street, absence of impedimenta in business portions of buildings, good lighting.

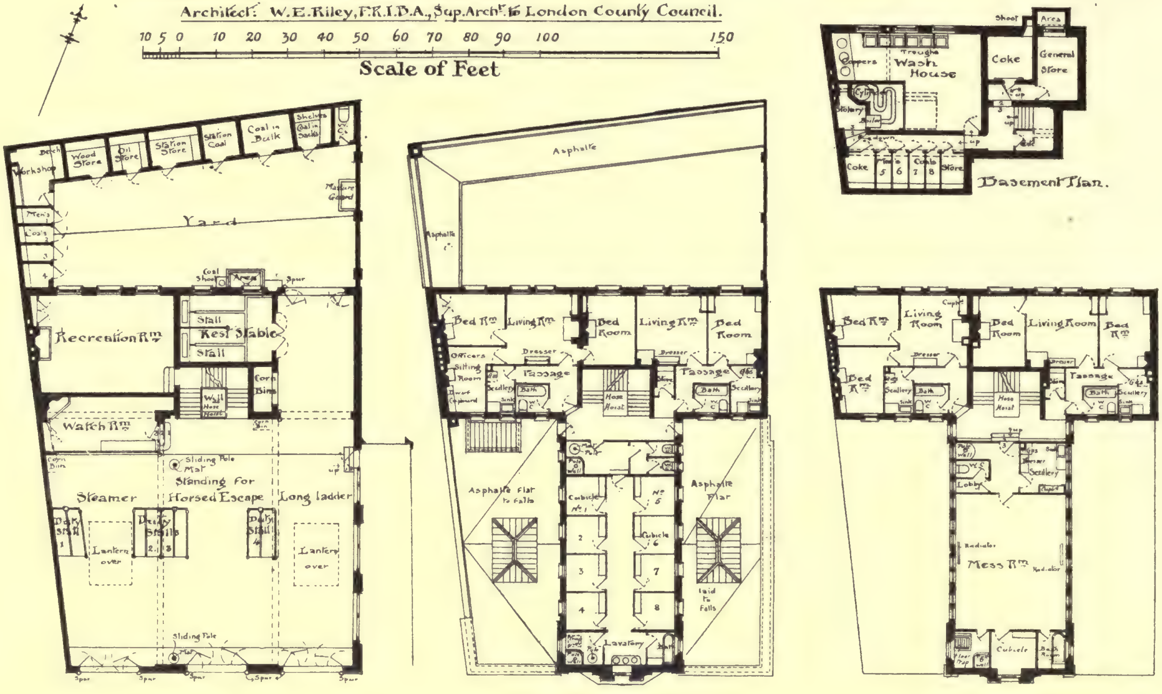
(*b.*) Engine-house, stalls for harnessed horses, extra stables; hose-hoist, "escape" storage-space, wagon-sheds; offices; drill-yard, mess-room, recreation-room; look-out tower; stores; boiler-house; workshops; lavatories, &c.; drying-closets, wash-house; residential quarters.

The single men in a station are provided with a mess-room

Plate XXIX. 40'

London. Fire Brigade Station, Kensington.

Architect: W. E. Riley, F.R.I.B.A., Sup. Archt. to London County Council.



Ground Floor Plan.

First Floor Plan.

Basement Plan.

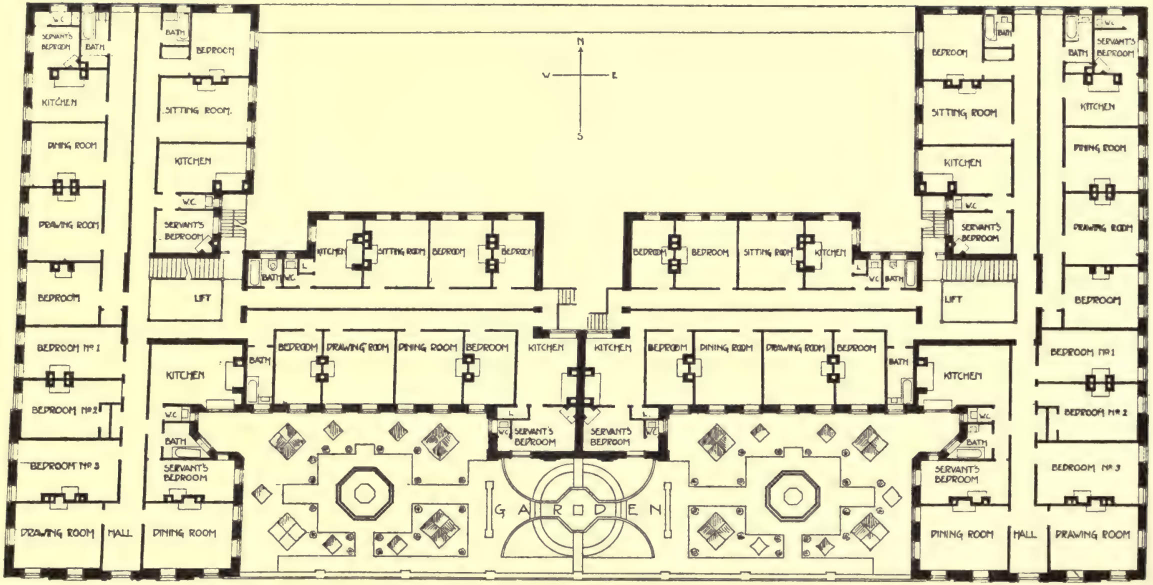
Second Floor Plan.

40^2

Plate XXX.

HORNTON COURT, KENSINGTON HIGH STREET, LONDON.

Joint Architects—F. K. CHESTERTON and J. D. COLERIDGE.



SECOND FLOOR PLAN.

Reduced Scale—48 feet to 1 inch.

and dormitory. The married men have individually a kitchen, scullery, bedroom, and W.C. (this accommodation is inadequate; two bedrooms should be the minimum provision, and a bath-room should be considered indispensable; on the other hand, kitchen and scullery might advantageously be combined, and by this means a living-room would be provided where cooking would not take place). An engineer-in-charge has one additional room, and a superintendent-in-charge has a further additional room, a bath-room, and an office.

An engine-house 27 ft. wide by 34 ft. deep will accommodate two fire-engines side by side and leave sufficient room as gangway. The stables are placed immediately behind the engine-house and in direct communication. The system in the metropolis, by which a horsed escape precedes the engine in response to a call, requires the engine-house to be 40 ft. long; and by increasing the width to 28 ft. 3 in., the positions of the escape and engine are interchangeable. The lower stages of the look-out tower may conveniently have the staircase-well utilised as a hose-hoist for drying the hose.

A watch-tower is no longer a necessity where there is street telephonic communication with the station; but a hose-tower or hoist is desirable.

A plan is given on Plate XXIX. of one of the metropolitan stations by Mr W. E. Riley, Superintending Architect to the London County Council.

Flats.—(*a.*) Adequate side-lighting, efficient provision for panic exits, sanitary requirements, avoidance of open staircase-wells, furniture requirements, accommodation to suit varied rentals and demands.

(*b.*) Suites of apartments, consisting of sitting-rooms and bedrooms, bath-room and W.C., and frequently kitchen and its offices; common bicycle room, common perambulator room; coal-cellars, box rooms and stores; common staircases and lifts, goods lifts, &c. Porter's office and apartments are also necessary.

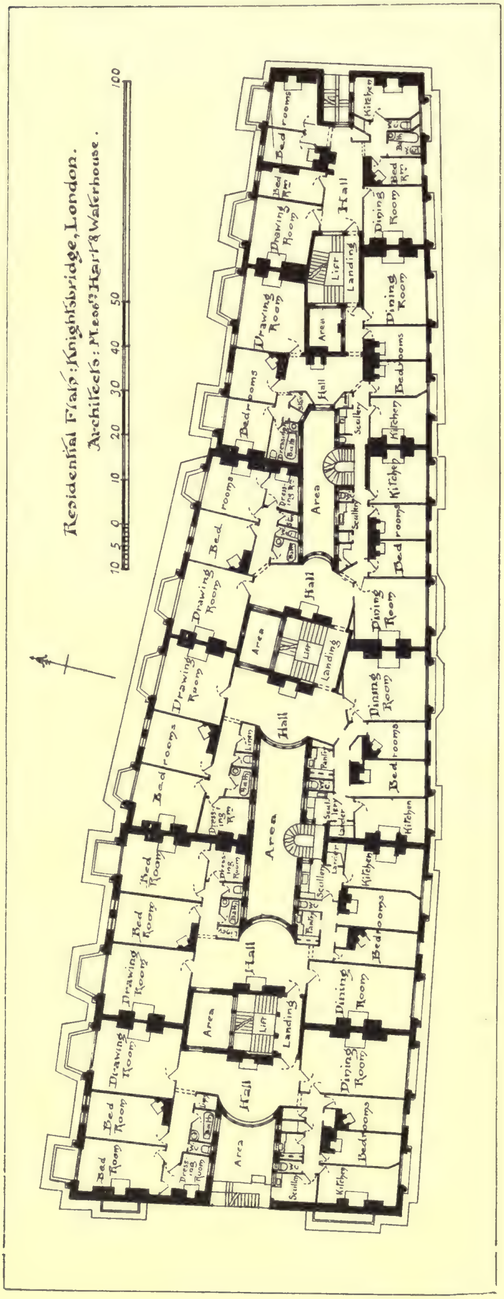


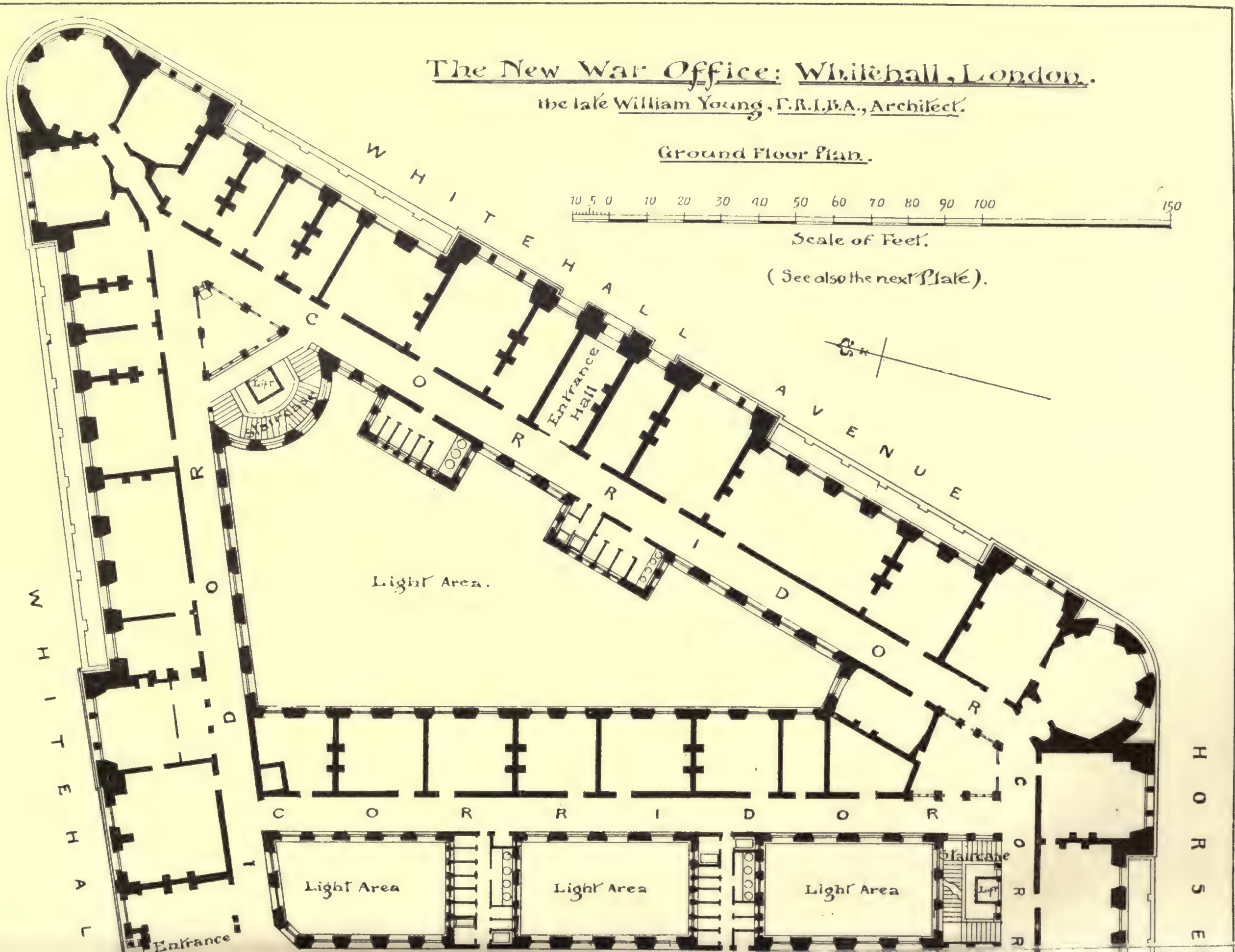
FIG. 9.

There are many varieties of flats, and the accommodation required depends upon many circumstances. Bachelor suites, catering flats, family suites, all these vary greatly. Catering flats have a common dining-room for all the tenants, and often have a drawing-room and (perhaps) other social rooms in common. The cuisine is in common, with a staff of domestics for the whole building. Some flats are self-contained, save for the sleeping accommodation for servants, whose rooms may be concentrated at the top of the building. Sometimes the accommodation is spread over two floors or more, when the term "maisonette"

The New War Office: Whitehall, London.

the late William Young, F.R.I.B.A., Architect.

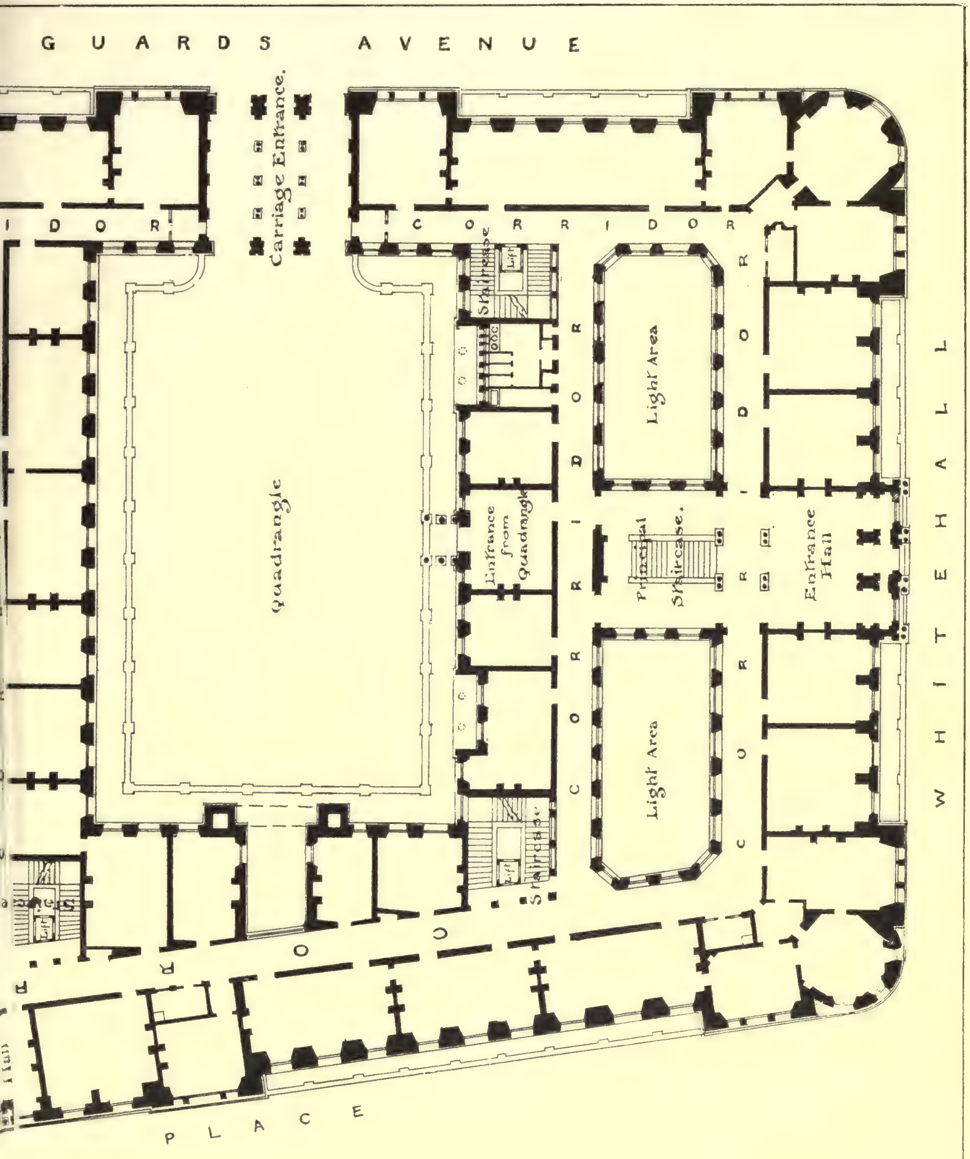
Ground Floor Plan.



(See also the next Plate).

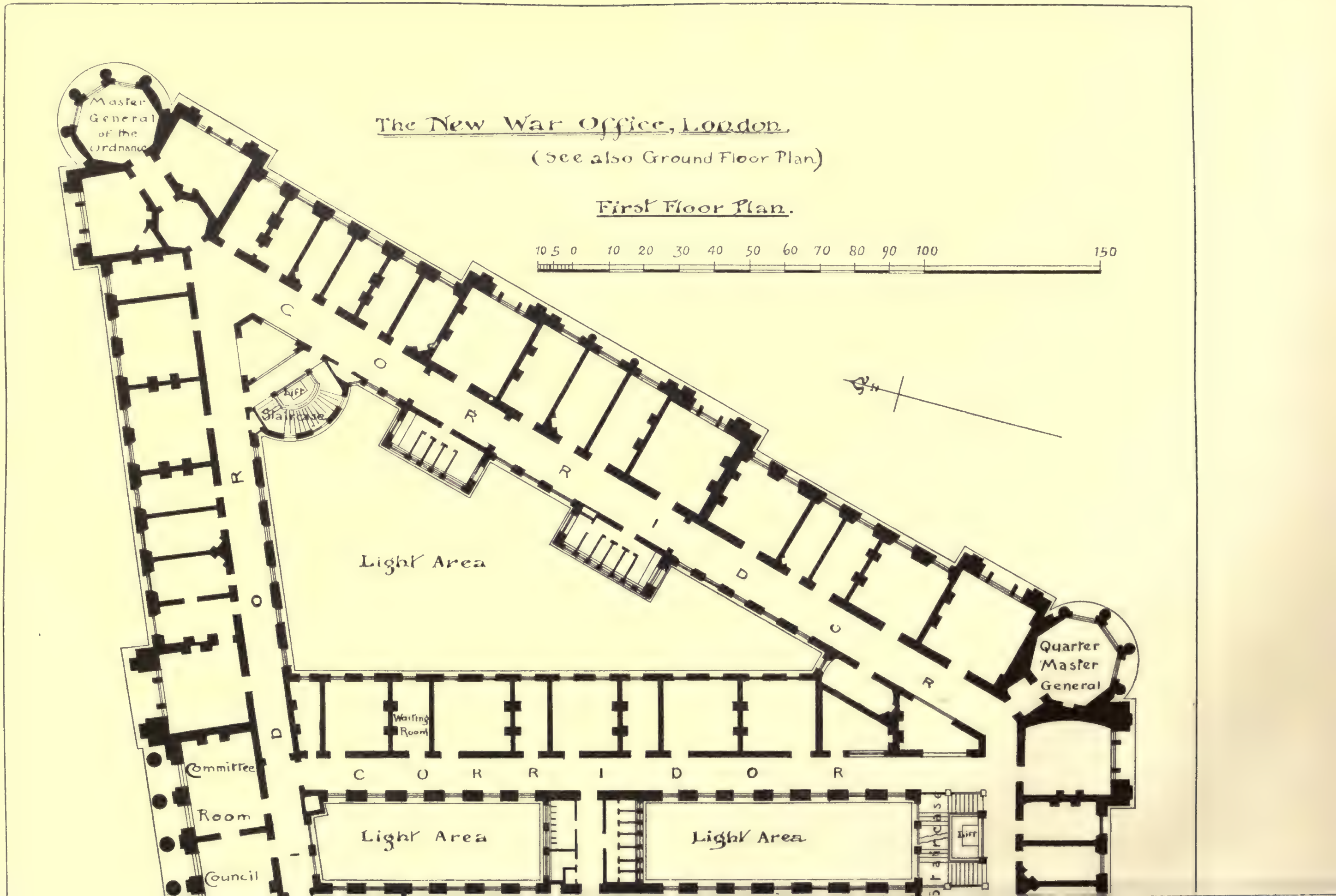
42²

Plate XXXI.



[*Between p.* 42 *and Plate XXXII.*

42^{3}



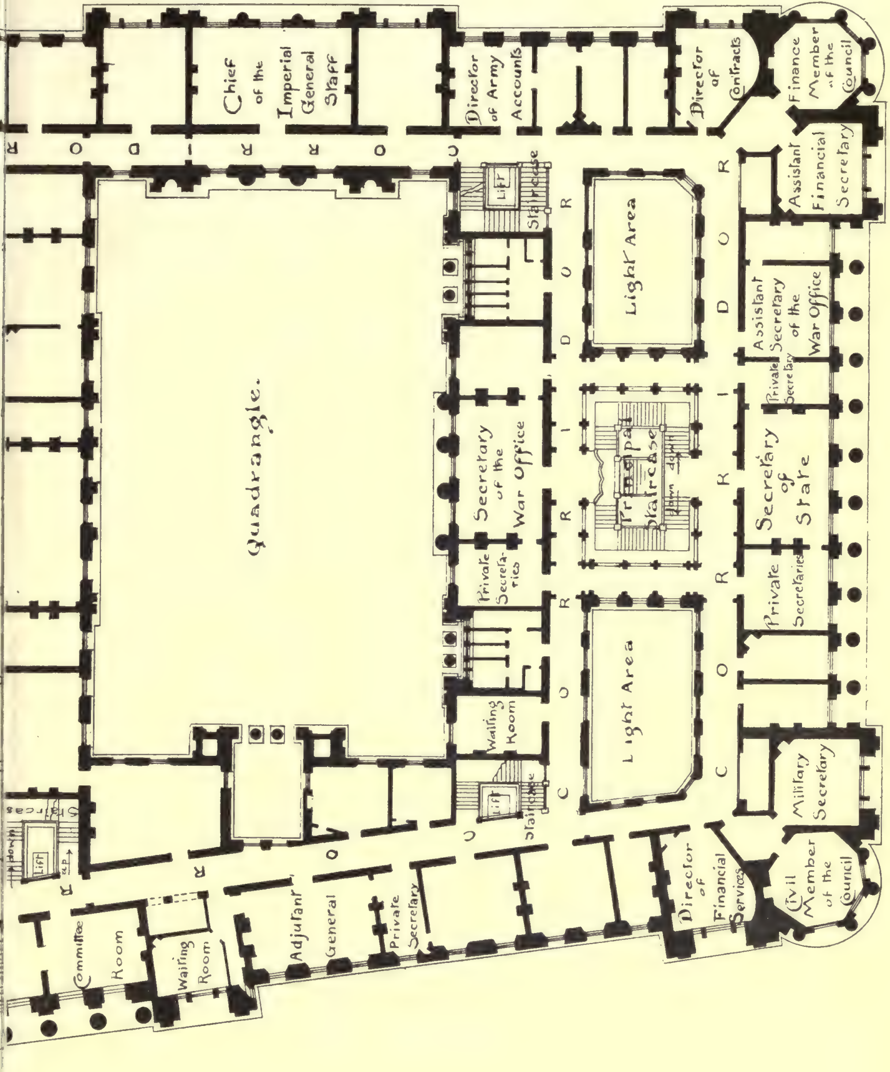
The New War Office, London.

(See also Ground Floor Plan)

First Floor Plan.

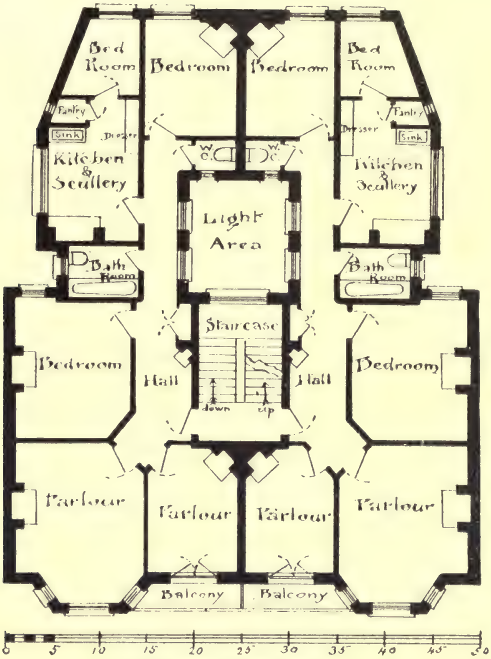
Y2Y

Plate XXXII.



[*Between Plate XXXI. and p.* 43.

is employed. Blocks of flats are illustrated on Plate XXX. and in Fig. 9, and a cheaper type of flat is shown in Fig. 10.



Type of Flats : Maida Vale

FIG. 10.

Fowl Run.—See Poultry Run under "Outbuildings."

Government Offices.—(*a.*) Good intercommunication of offices, spacious corridors, good lighting, dignity of plan, seclusion of strong-rooms, adequate entrances, grouping.

(*b.*) The permanent staff will require in each department:—Rooms for the Chief and the various secretaries; offices for the differently classed assistants; waiting-rooms; typewriting and telephone offices; lavatories, cloak-rooms, &c.; porter's room; strong-rooms; and frequently some special rooms

Besides these there should be a suite of offices for the responsible Minister or State Secretary.

All these requirements are liable to modifications, and it is customary, when an occasion arises for planning Government Offices, to issue a schedule of required accommodation and approximate size of offices. For two of the War Office plans see Plates XXXI. and XXXII.

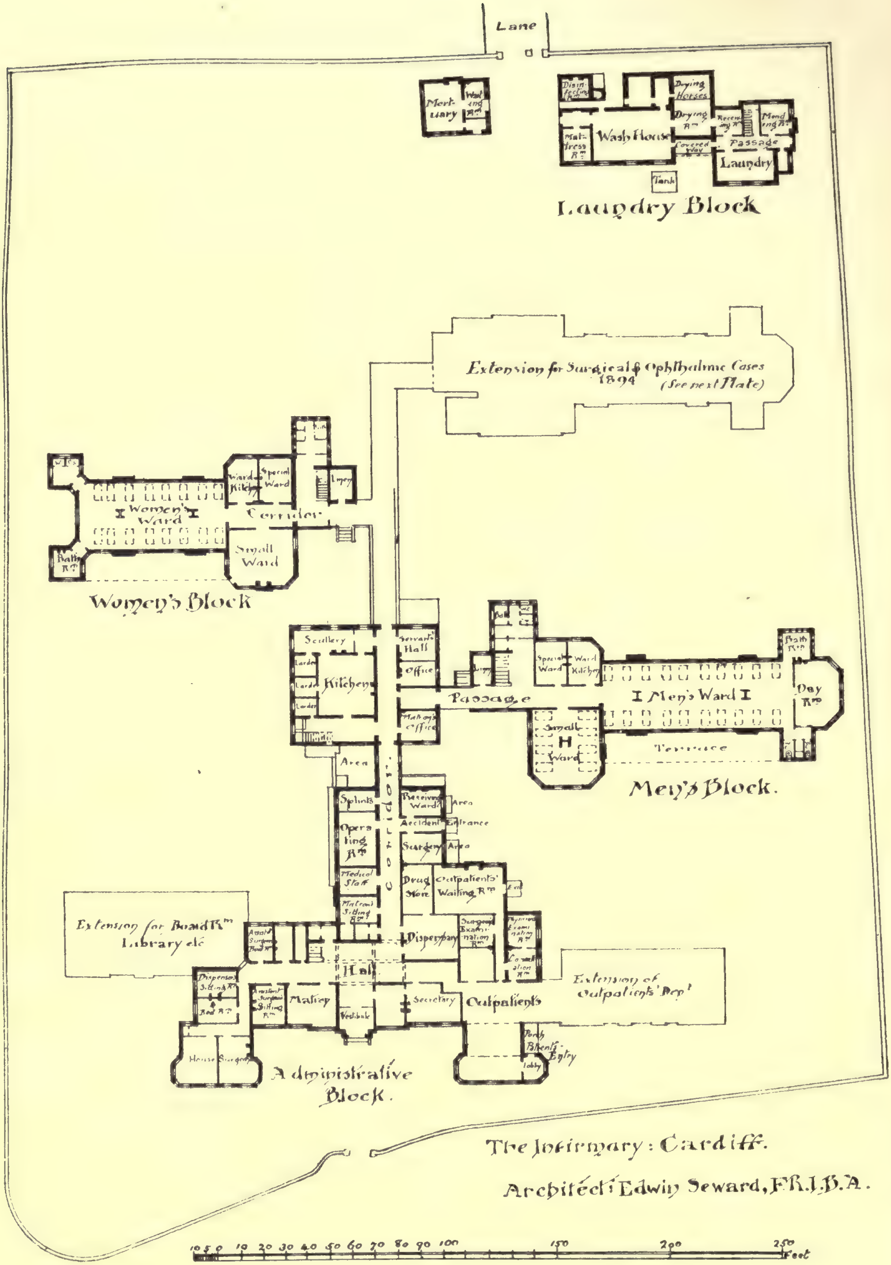
Granary.—See "Outbuildings."

Hall.—See under "Concert Hall" and "Village and Workmen's Clubs."

Hospital and Infirmary.—(*a.*) Central administration, sanitary requirements, aspect, preservation of uninfected zone (for fever hospitals), plenty of window surface, grouping, prospect (for benefit of convalescents), panic exits, classification of patients, extended ground plan, ventilation.

(*b.*) Wards for specified numbers of beds and distinct for the men, women, and children; separation (or isolation) and small wards; bath-room, bath-space, water and slop closets (preferably approached through a cross-ventilated lobby off the wards); nurses' duty rooms, nurses' rooms, day-rooms; operating theatre (with railed-off gallery for students), anæsthetic and recovery rooms; out-patients' department consisting of waiting-hall, consulting and dark rooms, and dispensary; administrative department containing rooms for matron, steward, physicians and surgeons, nursing and domestic staffs, waiting-rooms, kitchen and offices, stores, laundry establishment; stables and ambulance sheds, mortuary, disinfecting chamber, &c., &c. Frequently a medical school is attached.

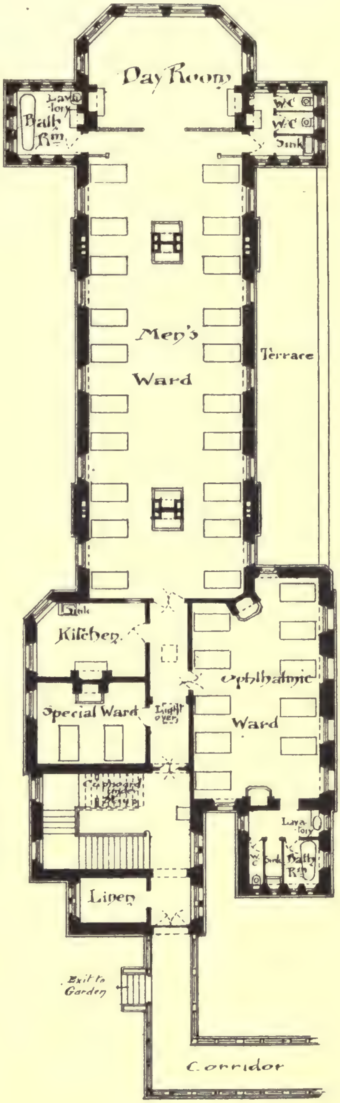
Plate XXXIII.



The Infirmary: Cardiff.

Architect: Edwin Seward, F.R.I.B.A.

Plate XXXIV.



The Infirmary: Cardiff.

See also previous plate.

Surgical & Ophthalmic Block.

Reduced Scale—32 feet to 1 inch.

A plan is given on Plate XXXIII. of the Infirmary at Cardiff by Mr Seward, an enlarged plan of one of the pavilions being given on Plate XXXIV.

Hospitals require varying accommodation according to their specific nature, and selections would be made as requisite from the above schedule. For a typical general hospital, the one in Gower Street, London, may be cited. The architects of this (the North London or University College Hospital) were successively Messrs Alfred and Paul Waterhouse. (See Plates XXXV., XXXVI., and XXXVII.) The specific differences between general and isolation hospitals, fever and smallpox hospitals, infirmaries, workhouse infirmaries and cottage hospitals need not be noted here; but it is of importance to add the following particulars. If infectious (or isolation) hospitals are the objects under consideration, the planning is very greatly varied. The pavilion system is widely recognised, both for general and isolation hospitals, as a very valuable factor in the treatment of patients. The Metropolitan Asylums Board, which is the authority under the Local Government Board for fever hospitals in London, pursues a very steady policy in the matter, though the individuality of the architects employed has plenty of scope. Smallpox is provided for in separate hospitals. In the others the accommodation will provide for scarlet fever, diphtheria (and enteric) ward pavilions each containing large and small wards, duty rooms, sanitary block, &c.; isolation block, receiving and discharging ditto, porter's lodge, medical officer's residence, superintendent's house, administrative offices and block, nurses' homes (separate blocks for day and night nurses), male and female servants' blocks, laundry or laundries, boiler and engine houses, disinfecting and destructor chambers, mortuary, workshops. The administrative block will contain matron's quarters, committee-room, doctor's room, waiting-room, dispensary, stores. Kitchen department, laundry, water storage, &c. are frequently in separate blocks.

Since the second edition was issued, a departure has been made respecting the isolation of suspicious cases, which are now placed in cubicles, of a floor area of some 120 ft. each; this entails a loss of beds of about 15 per cent. as compared with the accommodation in associated wards. The partitions are 7 ft. high, starting close to the floor, the partial sacrifice of ventilation, due to the absence of an air-space of a few inches in depth next the floor, being preferred to the alternative disadvantage of giving child-patients the opportunity of passing articles from cubicle to cubicle. The partitions would be about 2 in. thick, of a sanitary and fire-resisting nature, with glass panels in the upper portion. All wall and floor junctions should have rounded concave fillets. The cubicle door would be about 3 ft. high only, sufficient to keep a child securely inside, but not high enough to impede a free current of air. Cubicle doors should not face one another. Hot water or other pipe system of heating should circulate throughout the cubicles, whilst a central open fireplace would prove valuable in the axial corridor, the space over the cubicles acting also as an exhaust ventilator. There should be a fresh-air inlet and a large window with top hopper to each cubicle, thus ensuring cross-ventilation.

The nurses' blocks will provide general mess-room, cubicles (or bedrooms) 8 ft. 6 in. by 13 ft. each, bath-room (one to every eight nurses), W.C.'s, stores. And of course waiting-rooms for patients' friends are requisite, with robing-room in connection, where the hospital safety wrap is put on and off.

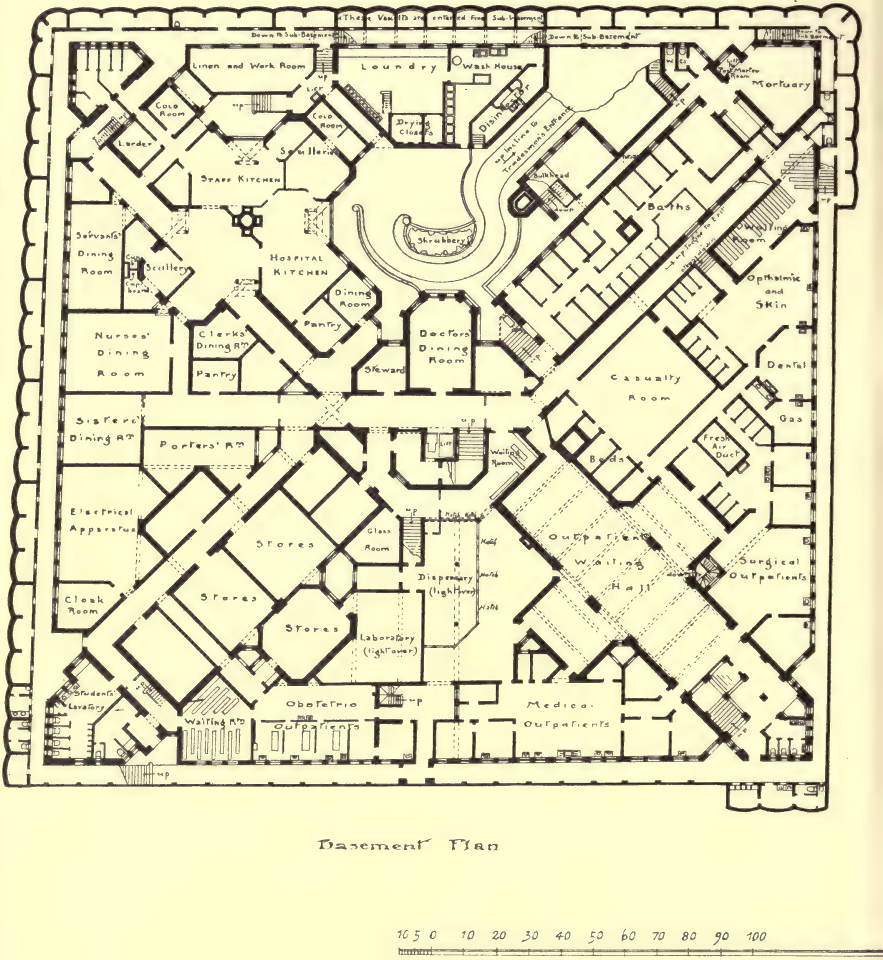
The laundry block should have separate laundries for patients' and for staff linen. It will be natural to work the boiler and engine houses in the same block. A bacteriological laboratory is now being favourably considered as an additional provision.

It is customary in the Metropolis for a zone of 100 ft. width to be maintained between the boundary wall and infected buildings, but the Local Government Board demands only 40 ft. zone and 40 ft. between blocks elsewhere. The basis of accommodation is that, necessary per patient in the ward, and though there is not a binding maximum, it is safe to take the following as not only the minimum, but also as the generally accepted desirable dimensions. It is a mistake to have excess of space in a hospital ward, as it but renders extra cleaning necessary, and serves (in

University College Hospital:

Gower Street, London

The late Alfred Waterhouse, R.A., etc.
Paul Waterhouse, F.R.I.B.A. } Successive Architects

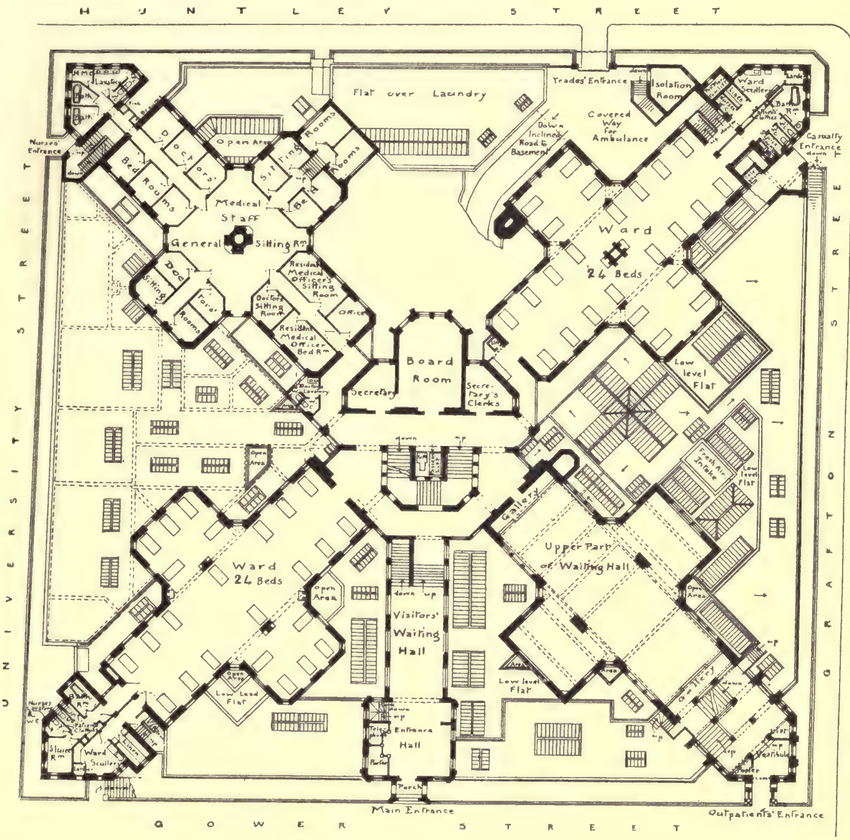


Basement Plan

[*See also the next two Plates.*]

462

Note. The Hospital, as rebuilt and occupying a much greater area than the previous buildings, was the gift of the late Sir John Blundell Maple, Baronet, and was carried out by the workmen of Messrs Maple & Co.

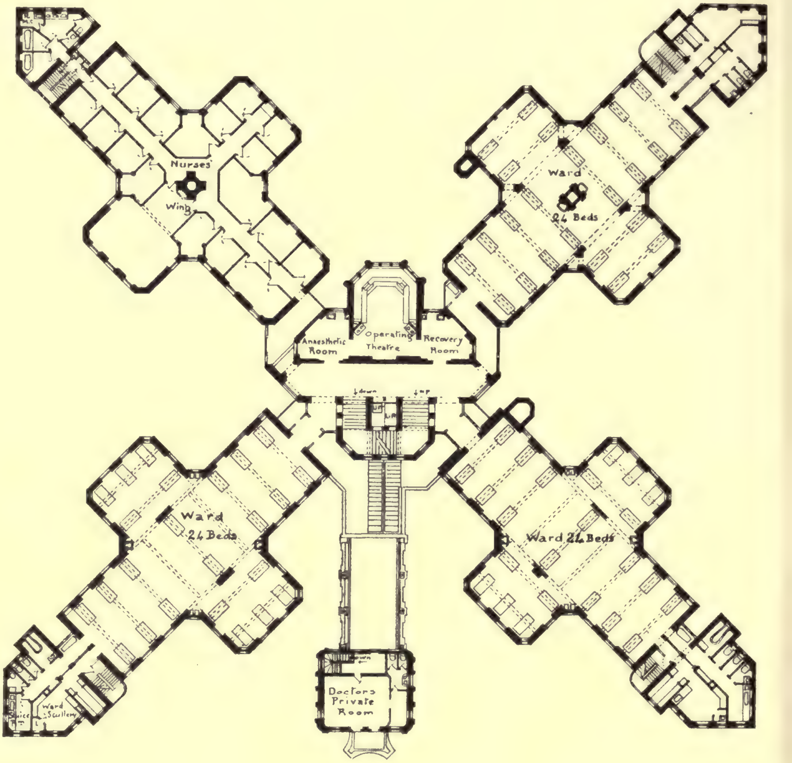


Ground Floor Plan

[*Between p.* 46 *and Plate XXXVI.*

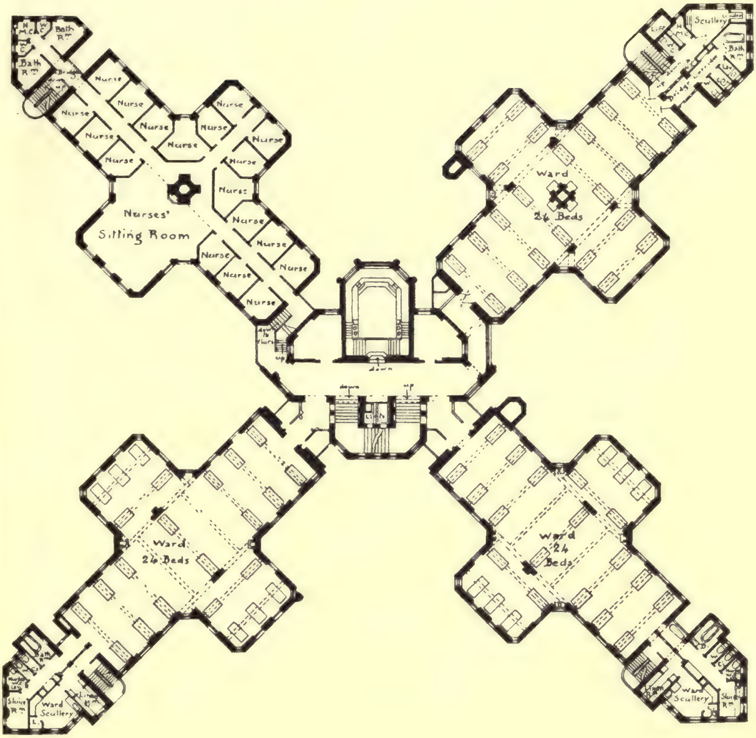
46^3

UNIVERSITY COLLEGE HOSPITAL, GOWER STREET, LONDON.



First Floor Plan:

[*See also the preceding and following Plates.*]

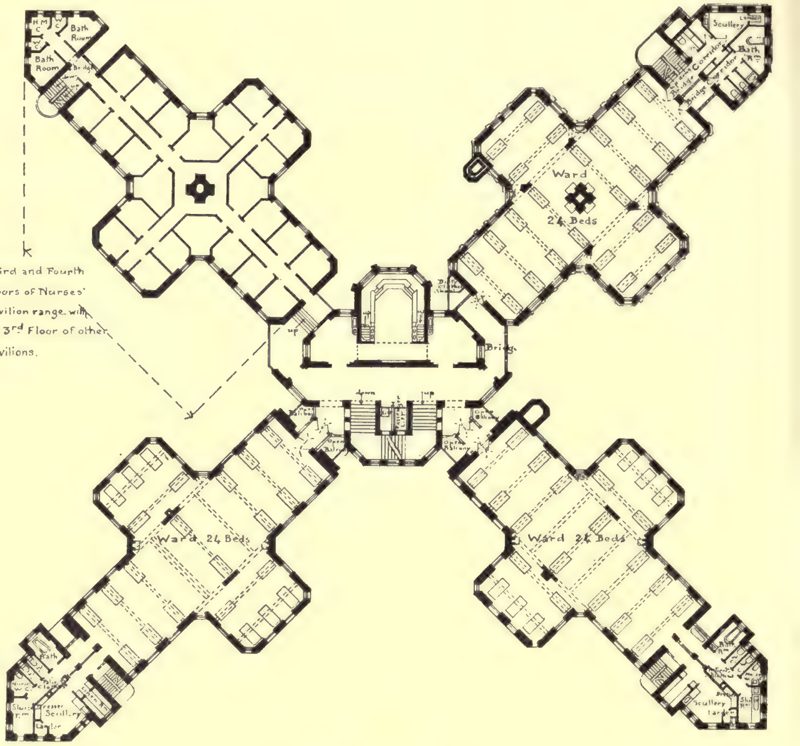


Second Floor Plan.

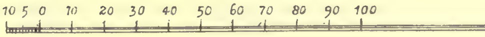
46^{5}

UNIVERSITY COLLEGE HOSPITAL,

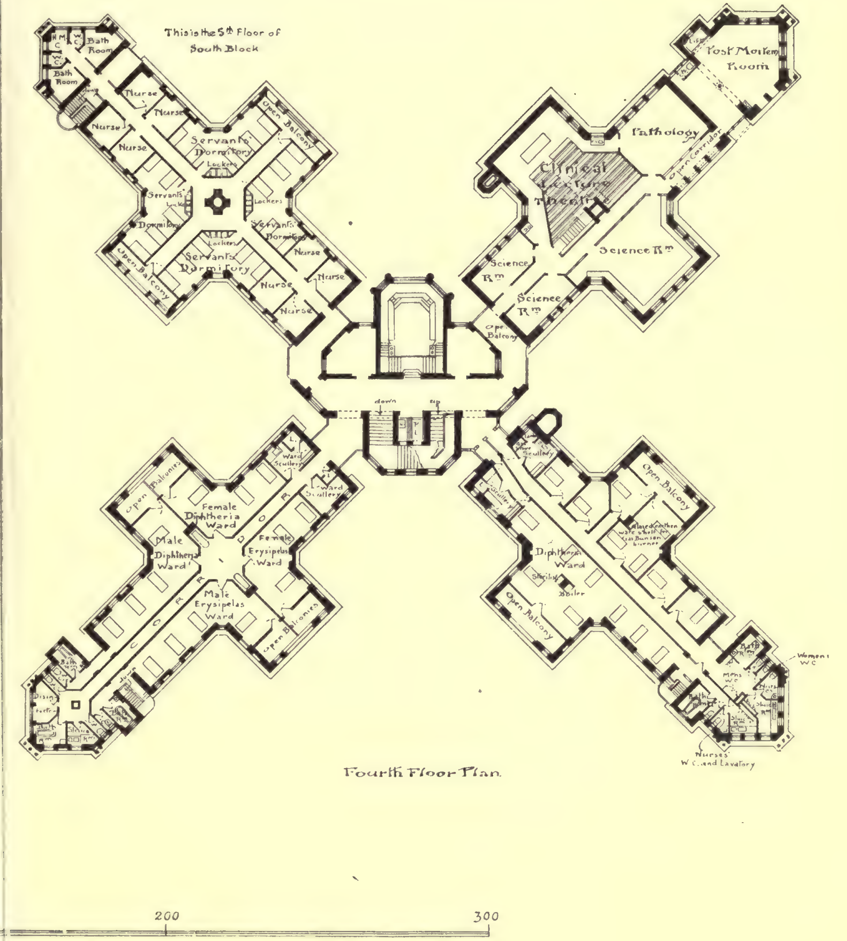
GOWER STREET, LONDON.



Third Floor Plan



[*See also the preceding two Plates.*]



Fourth Floor Plan.

infectious buildings) to provide more surface for disease germs and particles.

The Local Government Board issues Memoranda for the guidance of sanitary authorities with respect to the provision of isolation hospitals;* and seeing that schemes for these buildings (amongst many others) have to receive the sanction of this Government Department, a careful study of the pamphlets and model plans containing these hints should be accorded. The Board's medical officer takes the following as the desirable standard dimensions:—Not less than 2,000 cub. ft. of air space, 144 super. ft. of floor space, and 12 lineal ft. of wall space per patient in ward. The analysis of wall and floor space is thus:—

	ft.	in.
Width of bed - - -	3	4
Half gangway on each side (4 ft. 4 in.) - -	8	8
	12	0

	ft.	in.
Length of bed - - -	6	3
Distant from wall - -	0	6
Space reserved at foot -	1	0
Half clear width of gangway	4	3
	12	0

12 ft. by 12 ft. gives 144 super. ft. The space reserved at the foot of the bed is for a table for medicine, &c. Besides the above there is an additional width of central gangway to be provided, which will be encroached upon by the stove; 2 ft. will suffice ordinarily, and this gives a width of 26 ft. for the ward. As regards superficial space per patient, a greater amount is provided in the case of diphtheritic, enteric and smallpox patients.

Wide gangways are desirable both for sanitary purposes and to give ample scope for the customary clinical courses, where a medical school is attached to the hospital. For wards in general hospitals, and in children's wards, it is considered that the requisite space per "bed" may be reduced to 100 ft. and 90 ft. super. respectively. One square foot of glass to every 70 cub. ft. of ward space is recommended, with a cross axis for each ward of S.E. and N.W., to obtain satisfactory lighting.

The small wards in a pavilion are desirable for isolating doubtful cases and for the reception of special patients, and may be 12 ft. by 10 ft. by 10 ft. in height.

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* "On the provision of Isolation Hospital accommodation by Local Authorities" (May 1902) and the Appendix to same (March 1908).

The sanitary block (approached by preference through a cross-ventilated lobby) should contain at least two W.C.'s and a urinal, a bath-room, a slop closet, and standing space for a roller bath. Sometimes a day-room is provided for each ward floor, and this is a commendable arrangement; it should give access to as much sunshine as possible, as the latter possesses valuable healing properties: this room is frequently so treated as to justify and receive the title of the "Sun Room." A space for food trolleys and a linen store is also required for each pavilion. An escape staircase should be provided in connection with each pavilion, preferably at the centre of one of the long side walls.

Cottage Hospitals are for the reception of ordinary cases to the number of about twenty-five at the outside. In such a hospital the planning would be on the block system, not the pavilion type. Allow per patient in ward 100 ft. super. and 1,200 ft. cube; with a lineal wall-space of 8 ft. this gives a ward 12 ft. 6 in. in breadth if beds are placed without *vis-à-vis*, or 25 ft. otherwise. In the hospital illustrated on Plate XXXVIII. the proportions are varied.

On Plates XXXIX. and XL. are shown plans of a Nursing Home at Oxford.

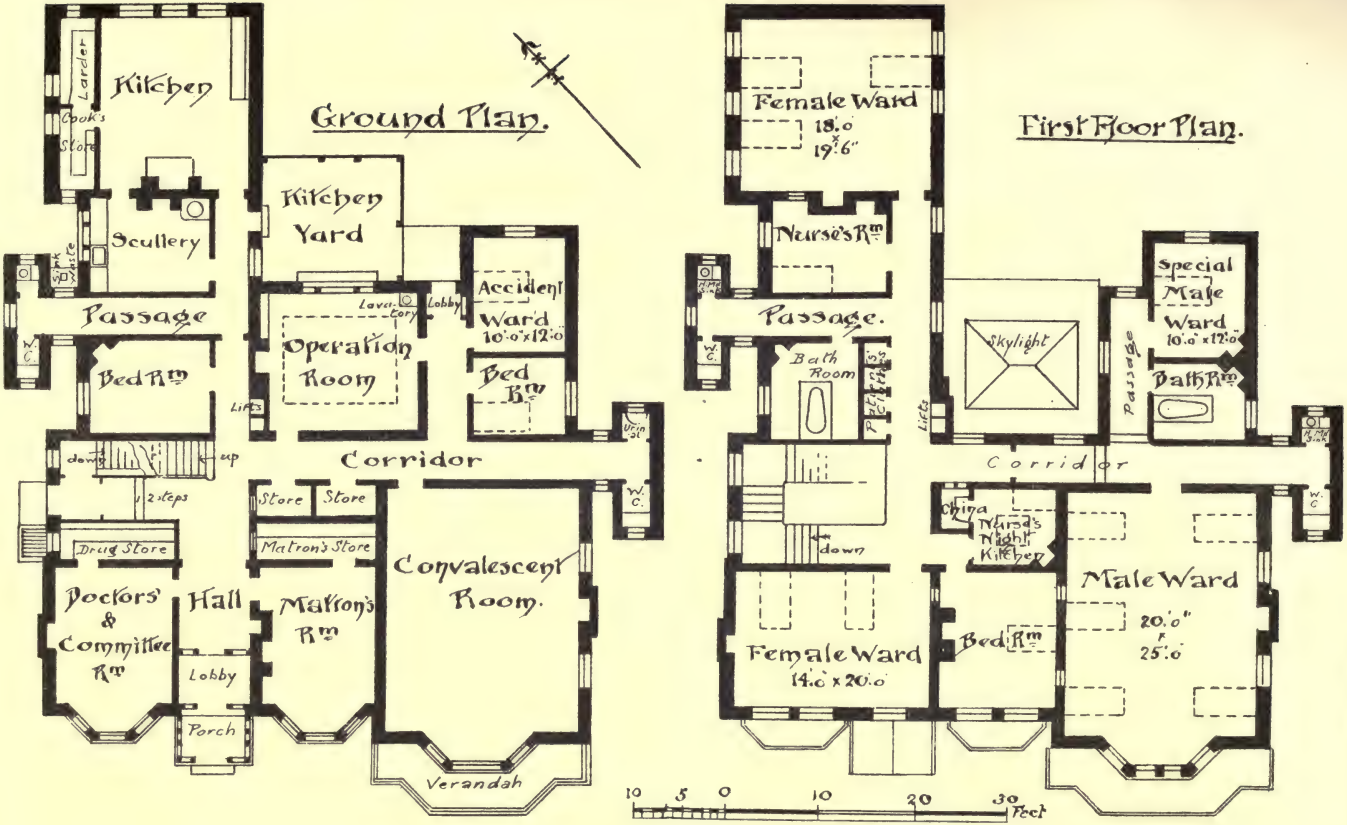
Workhouse infirmaries require very careful planning and have to satisfy the requirements of the Local Government Board.

Convalescent Homes form separate establishments for patients, pending their complete restoration to health.

Hotel.—(*a.*) Adequate lighting, heating and ventilation; panic exits, sanitary requirements, simplicity of plan, avoidance of open stair-wells, furniture requirements, expedition in and economy of service, economy of administration, culinary department.

(*b.*) Lounge (or winter garden), entrance hall or halls, grand staircase, coffee room, commercial room, dining-room, grand salon, smoking and billiards rooms and bar, reading-room, writing-room, private dining-

Plate XXXVIII. 48



COTTAGE HOSPITAL AT SURBITON, SURREY.

Architect—ERNEST CARRITT.

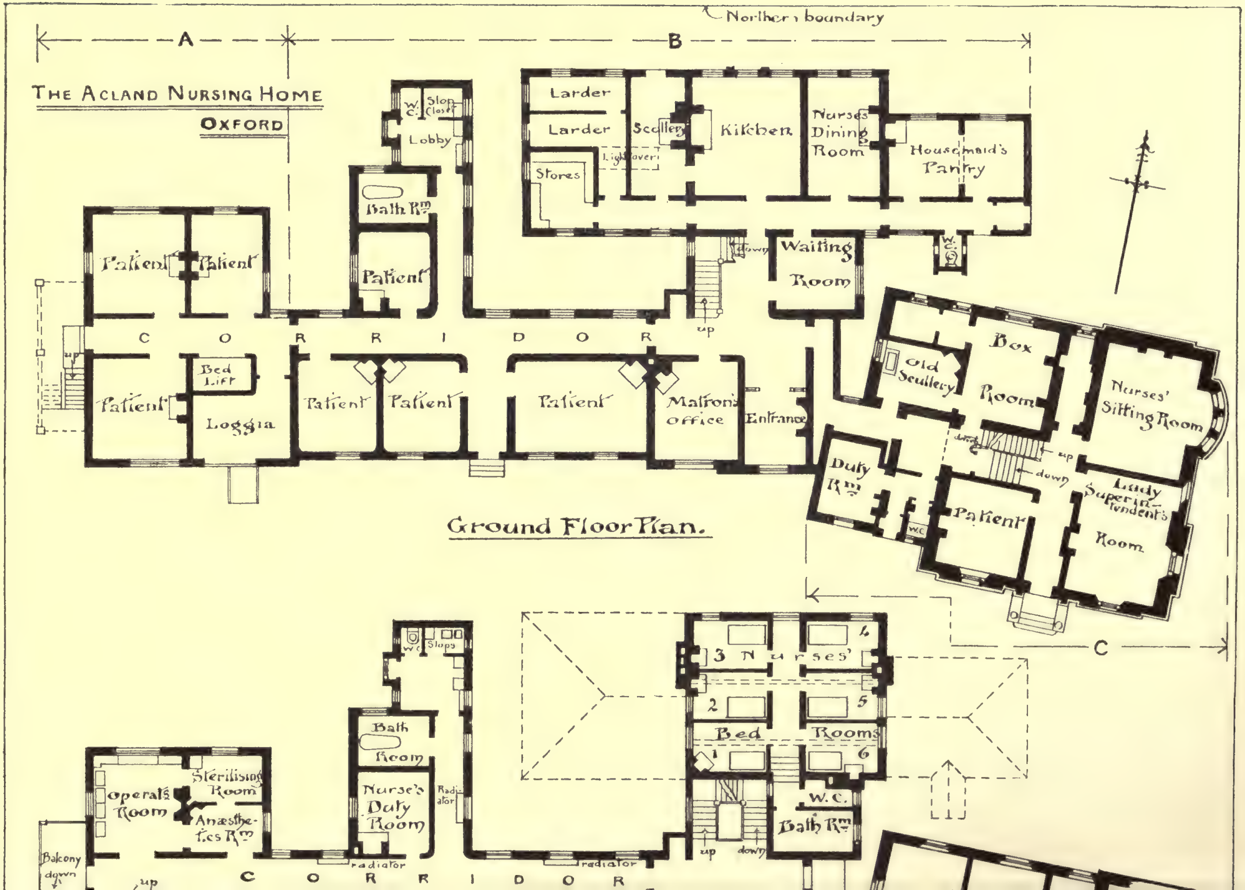
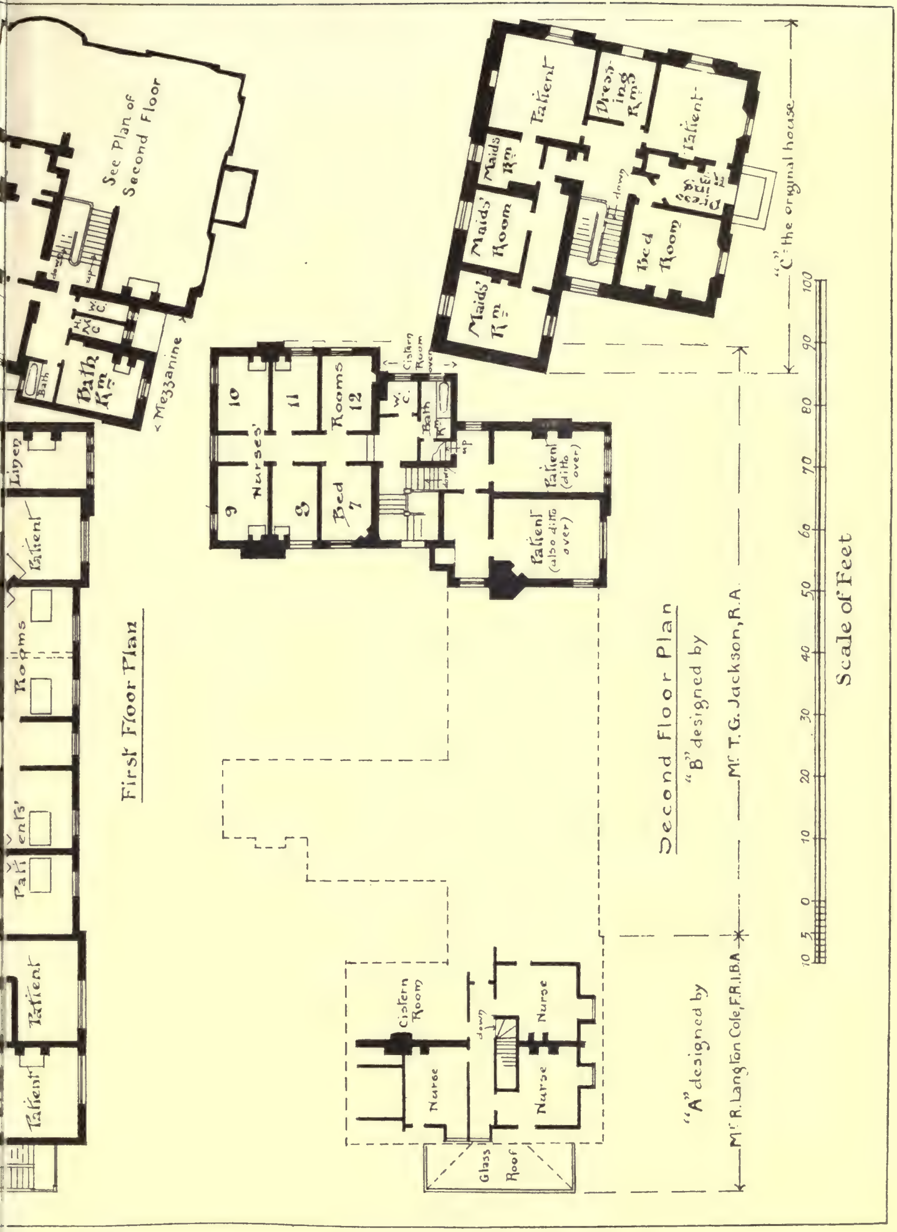

The Acland Nursing Home
Oxford
Ground Floor Plan.
Northern boundary
A
B
C
Larder
Larder
Stores
Scullery
Light over
Kitchen
Nurses Dining Room
Housemaid's Pantry
W.C.
Waiting Room
down
up
W. C.
Slop Closet
Lobby
Bath Rm
Patient
Patient
Patient
Patient
Bed Lift
Loggia
Patient
Patient
Patient
Matron's office
Entrance
C O R R I D O R
up
Box Room
Old Scullery
Nurses' Sitting Room
Lady Superintendent's Room
Patient
Duty Rm
W.C.
up
down
down
W.C
Slops
Bath Room
Nurse's Duty Room
Radiator
Operating Room
Sterilising Room
Anæsthetics Rm
Balcony
down
up
radiator
radiator
C O R R I D O R
4
5
6
3
2
1
Nurses' Bed Rooms
W. C.
Bath Rm
up
down

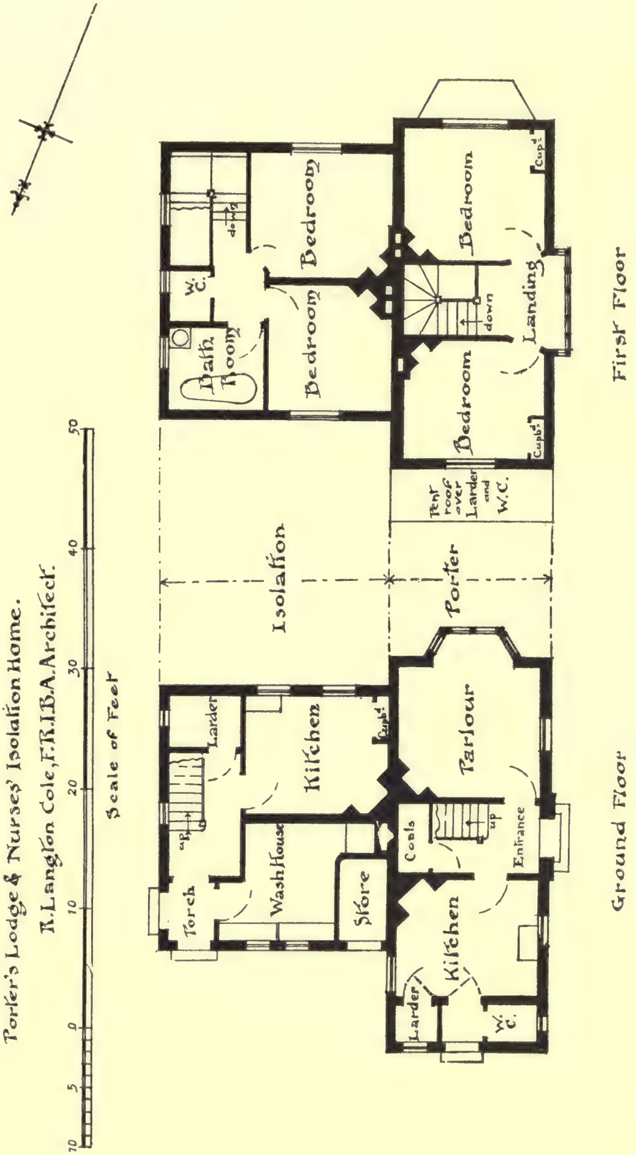
Plate XXXIX.



[*Between Plates XXXVIII. and XL.*

48^{4}

Plate XL.



THE ACLAND NURSING HOME : OXFORD.

Porter's Lodge & Nurses' Isolation Home.

R. Langton Cole, F.R.I.B.A. Architect.

rooms; Masonic Temple and tyler's room; reception, music and ball-rooms and their accessories; restaurant and grill-room, banqueting hall, sample-room, waiting-rooms, offices, manager's room; private suites for bachelors and for families; bedrooms, cloak-rooms and lavatories, bath-rooms and W.C.'s, Turkish and medical baths; passenger and service lifts; porter's room, telephone, postal, parcels and receiving and luggage rooms, toilet and hairdressing rooms; kitchen department, chef's room; rooms for staff, including mess-rooms, servants' hall, &c.; cycle and other stores, &c. &c.

A selection only will form the accommodation usually provided, according to the nature and locality of the hotel. An orchestra is often provided for the dining-room, most effectively in a music gallery. Where there is not a ball-room or music-room, a "spring" floor should be laid in the dining-room for the benefit of the votaries of Terpsichore. A Terrace (open-air) Café is a welcome feature. The average dimensions of the hotel bedroom are 12 ft. by 8 ft. In well-arranged hotels there should always be interposed between the corridor and the bedroom a small room, either as a dressing-room or a box-room.

For the use of the staff there should be but one entrance and exit, for better surveillance. A receiving and weighing room is a necessity in all but the smaller hotels; there should also be cold storage, to allow of economies in laying in, and for preserving, perishable articles of consumption.

It is customary to instal an island "range" of large dimensions in the kitchen of an important hotel, this range having several ovens; being isolated, the preparation of several dishes simultaneously is facilitated. A direct vertical flue is thus rendered impossible (or at least too unsightly even for a kitchen). Consequently, after an economical consumption of all the heat—and incidentally of the smoke—the resulting fumes are directed downwards, then carried in a horizontal flue under the floor, and thence carried to a vertical flue in one of the walls. These ranges may be 18 ft. by 6 ft. or of even greater dimensions.

On Plate XLI. the plans of the Westminster Palace Hotel, shown in the previous editions, are retained for the good points they exhibit; more modern hotels are shown in Fig. 11 and on Plates XLII., XLIII., and XLIV. The x's on the plans on the last Plate indicate the position of hydrants. This hotel was originally designed by Mr C. J. Phipps, and on his death the work was carried out by Messrs Isaacs & Florence on very varied lines.

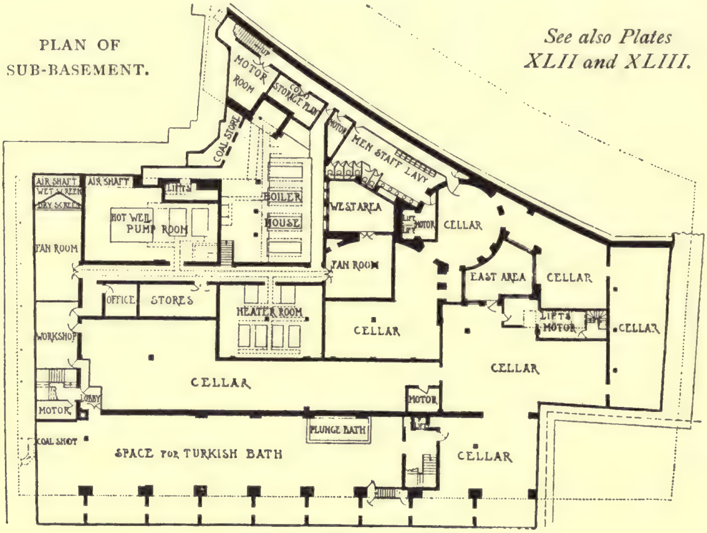


FIG. 11.—PICCADILLY HOTEL, LONDON.
Reduced Scale—65 feet to 1 inch.

House.—See Chapter IV., pp. 88 *et seq.*

Infirmary.—This is dealt with under the heading of "Hospital."

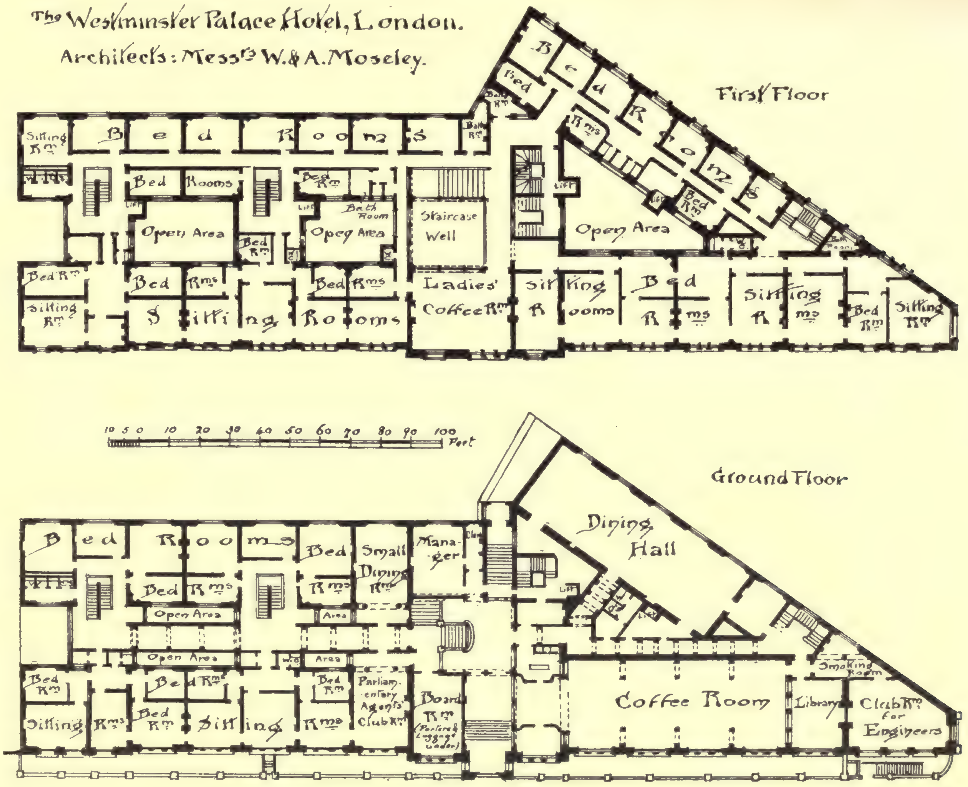
Institute.—See "Polytechnics."

Kennels.—See Dog-kennels under "Outbuildings."

Kursaal.—(*a.*) Plenty of light and space, rooms for recreative purposes of varied kinds.

Plate XLI.

50'



The Westminster Palace Hotel, London.

Architects: Mess^rs W. & A. Moseley.

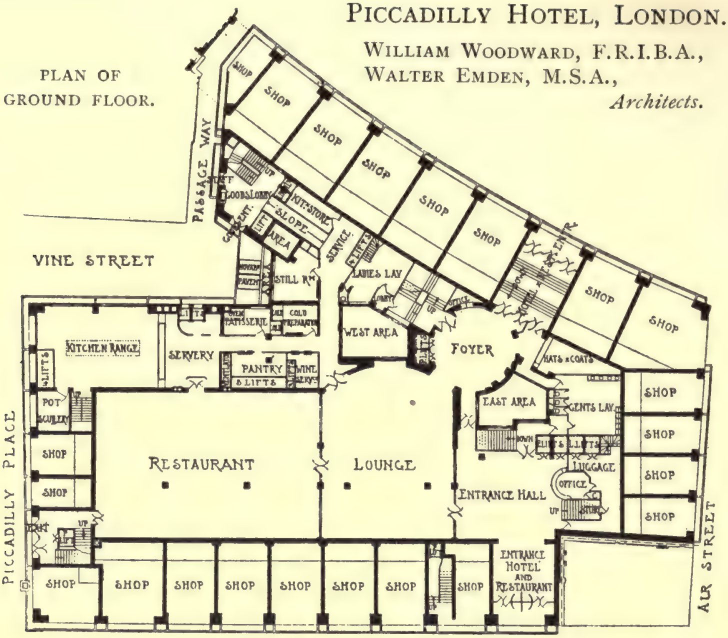
50^{2}

Plate XLII.

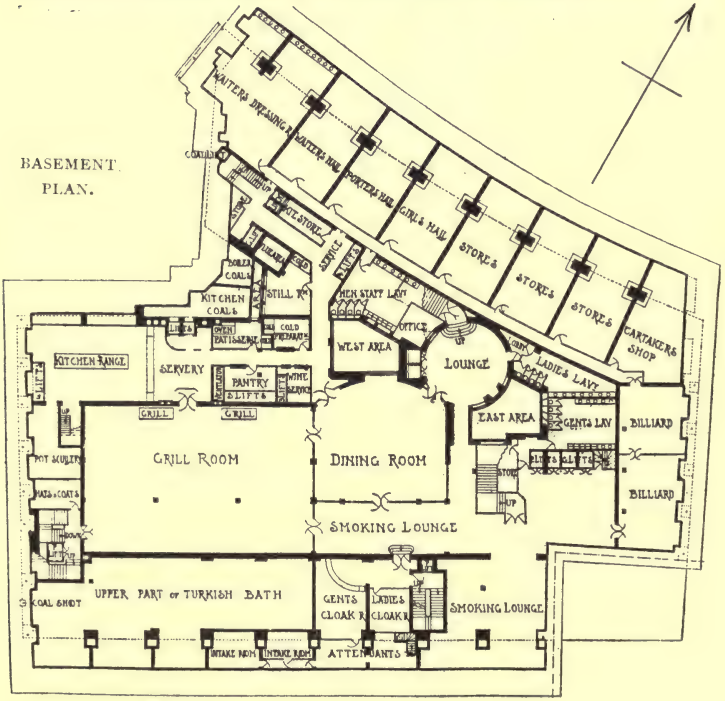
PICCADILLY HOTEL, LONDON.

WILLIAM WOODWARD, F.R.I.B.A.,
WALTER EMDEN, M.S.A.,
Architects.

PLAN OF
GROUND FLOOR.



BASEMENT
PLAN.



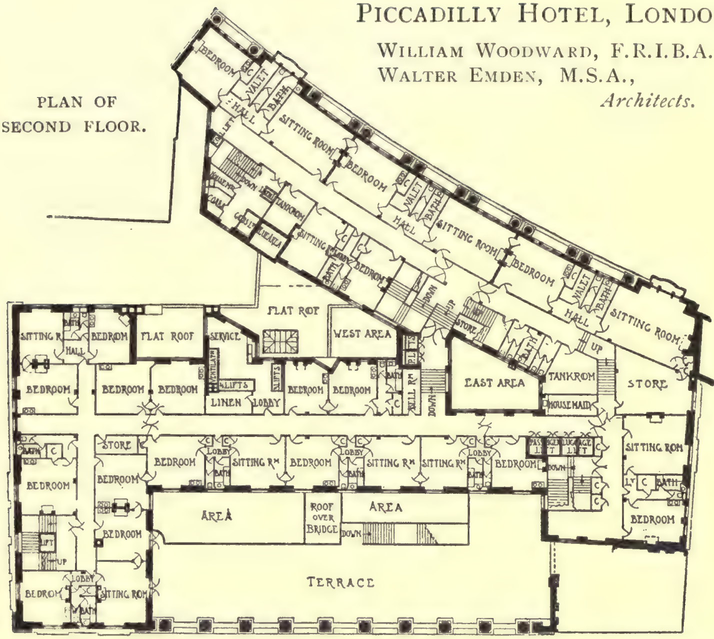
Reduced Scale — 65 feet to 1 inch.

Plate XLIII.

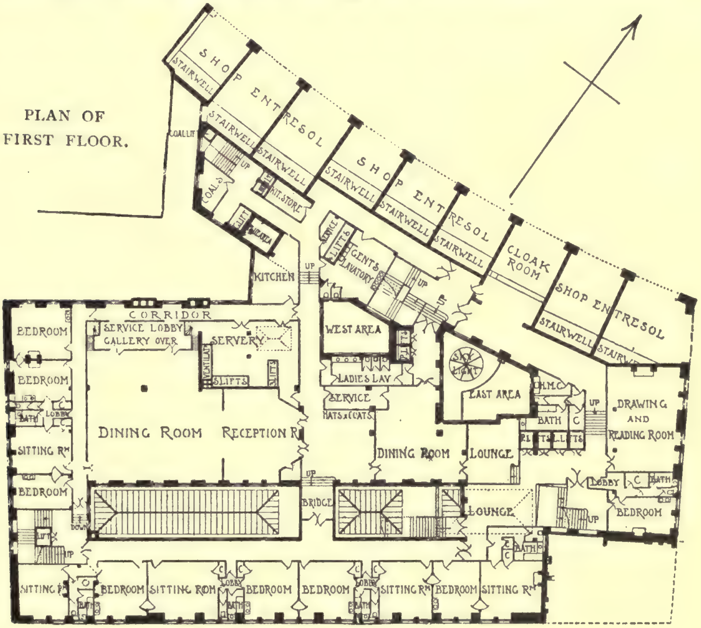
PICCADILLY HOTEL, LONDON.

WILLIAM WOODWARD, F.R.I.B.A.,
WALTER EMDEN, M.S.A.,
Architects.

PLAN OF SECOND FLOOR.



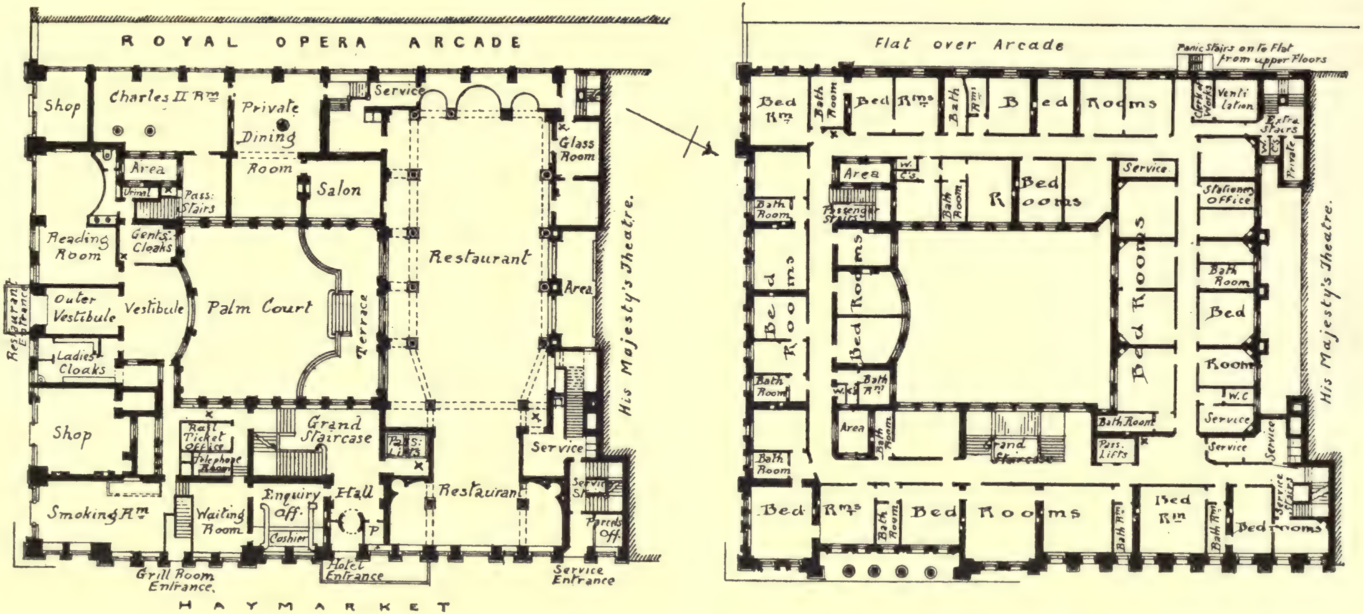
PLAN OF FIRST FLOOR.



Reduced Scale—65 feet to 1 inch.

Plate XLIV

504



Ground Plan

The Carlton Hotel, London.

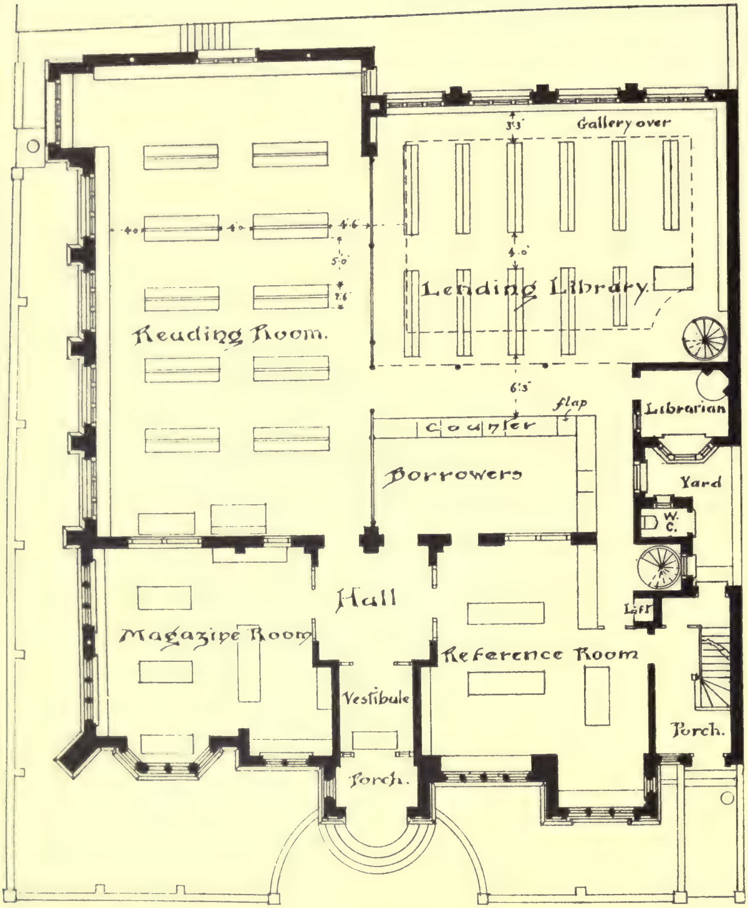
First Floor Plan

10 5 0 10 20 30 40 50 60 70 80 90 100 150 Feet

Architects—Messrs Isaacs & Florence.

505

Plate XLV.



The Passmore Edwards Public Library, Acton.
Architect: Maurice B. Adams, F.R.I.B.A.

Reduced Scale—20 feet to 1 inch.

(*b.*) Concert-hall ; reading, smoking and refreshment rooms ; (sometimes) a billiards-saloon ; dining-saloon ; cuisine department ; artistes' rooms, offices, lavatories, &c.

Laboratory.—See " Polytechnics."

Law Courts.—As for Assize Courts (*q.v.*).

Library and Reading-room.—(*a.*) Ample accommodation for public and for books, &c. ; good lighting ; efficient supervision of public portion ; exclusion of humidity from book stores.

(*b.*) The accommodation for free public libraries (central establishments) would be lending and reference departments (with ample storage for books), news-room, magazine-room (this may well be combined with the reference-room), librarian's office, sometimes a ladies' reading-room, and sometimes also a children's room. W.C.'s, &c. should be (but are frequently not) provided. Librarian's residence, consisting of a couple of living-rooms, three bedrooms, kitchen, &c.

Branch buildings of such libraries would be schemed on a less generous scale both as regards accommodation and size. There would be lending and reference and news-rooms, and a sub-librarian's office, book-storage, and caretaker's rooms. W.C.'s, &c. should be provided. The basis of accommodation is as follows :—In the news-room, the space per reader at a table, and the requisite space for an open newspaper at a reading-stand ; the provision of gangways is also to be reckoned with and it should be on a generous scale. In calculating the space per reader at the table, adequate allowance is to be made in accommodation for the average requirements of a journal ; 2 ft. 6 in. width and 2 ft. depth of table per reader is not excessive, and the depth of seating clear of the table should be 2 ft.

In the magazine-room the space per reader may be less than in the news-room; 2 ft. by 2 ft. of table would suffice.

In a large library calculations based on a provision of 4 ft. super. vertically for some four dozen volumes may be employed.

The advocacy of open-access Public Libraries has its adherents and opponents. For prolonged life of the books, there is but little doubt that the older system is preferable; but for the comfort and convenience of borrowers open-access shelves have everything in their favour. Top-lighting and high wall-lighting in conjunction are desirable. The book-checking and delivery counter may be 2 ft. wide by 2 ft. 6 in. high.

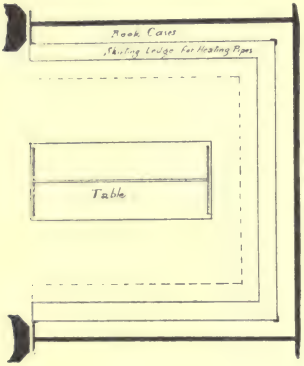


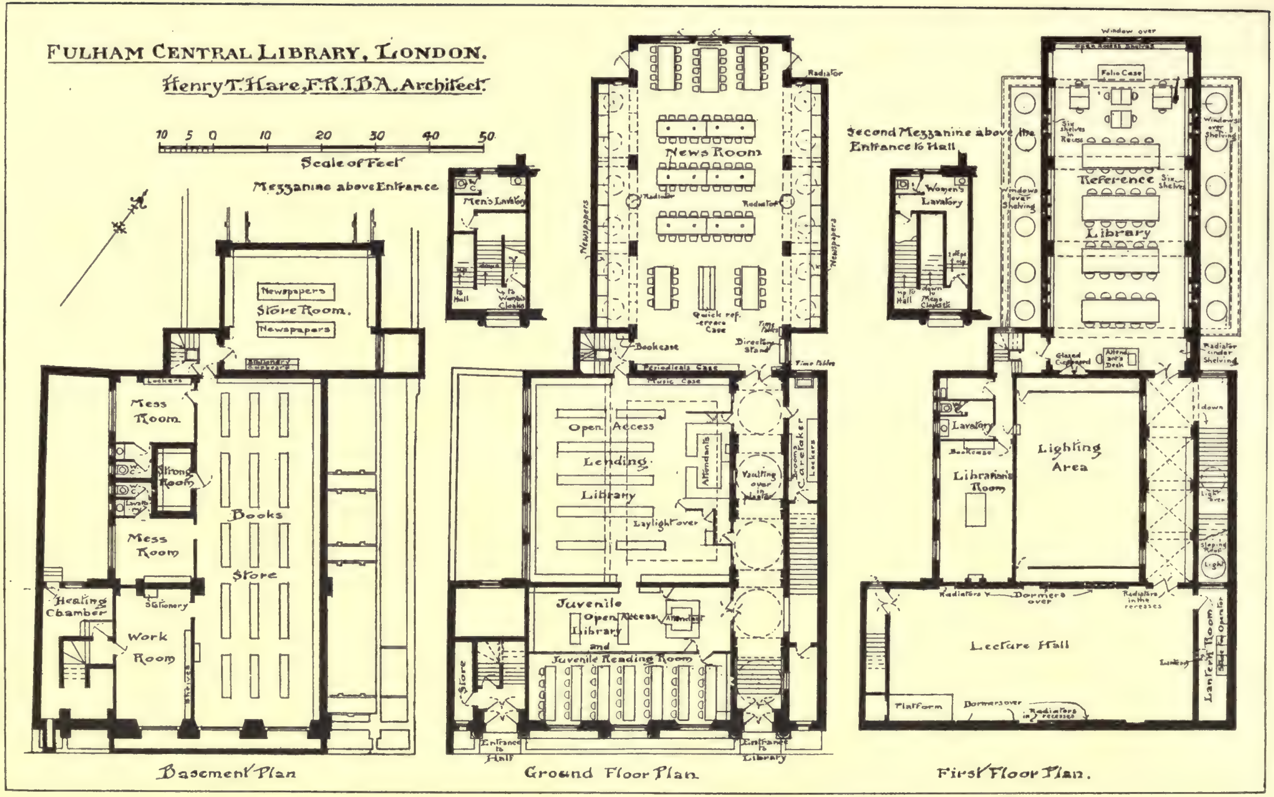
FIG. 12.—READING BAY IN THE GUILDHALL LIBRARY.

In many reading-rooms the planning shows a succession of bays with a double table in each, and this is a very good arrangement, as it gives greater quiet and seclusion for careful study; central tables are also provided along the nave. These bays secure additional shelvage for books under very economical conditions. Book-shelves should be not less than 10 in. deep; they should not extend too near the ceiling, as vitiated air impoverishes the bindings. A good example of this treatment occurs at the Guildhall Library in London by Sir Horace Jones (see Fig. 12), where it is further improved by the introduction of a triforium gallery with shelvage for books, with the returns of bays carried up.

The principal reading-room in the British Museum, 140 ft. in diameter, provides very comfortable and complete reading spaces. The width per reader is 4 ft. 2 in. and the depth 2 ft., and this space provides a reading-stand and a shelf for books (both of which are hinged to the back of the desk, and can be laid in flush to be out of the way when not required to be used), a pen-rack, ink-stand, hat-rack, paper-weight, paper-knife and

52'

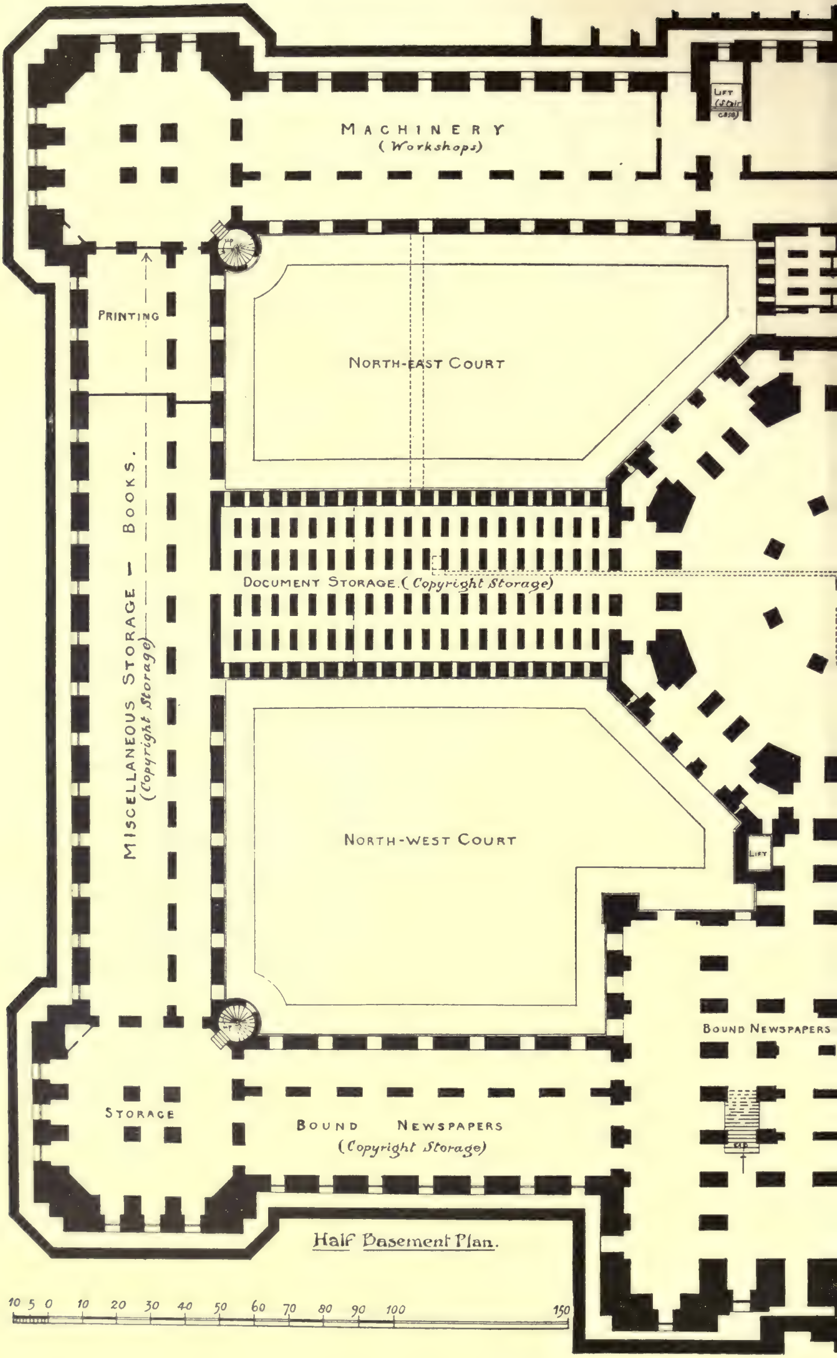
Plate XLVI.



FULHAM CENTRAL LIBRARY, LONDON.

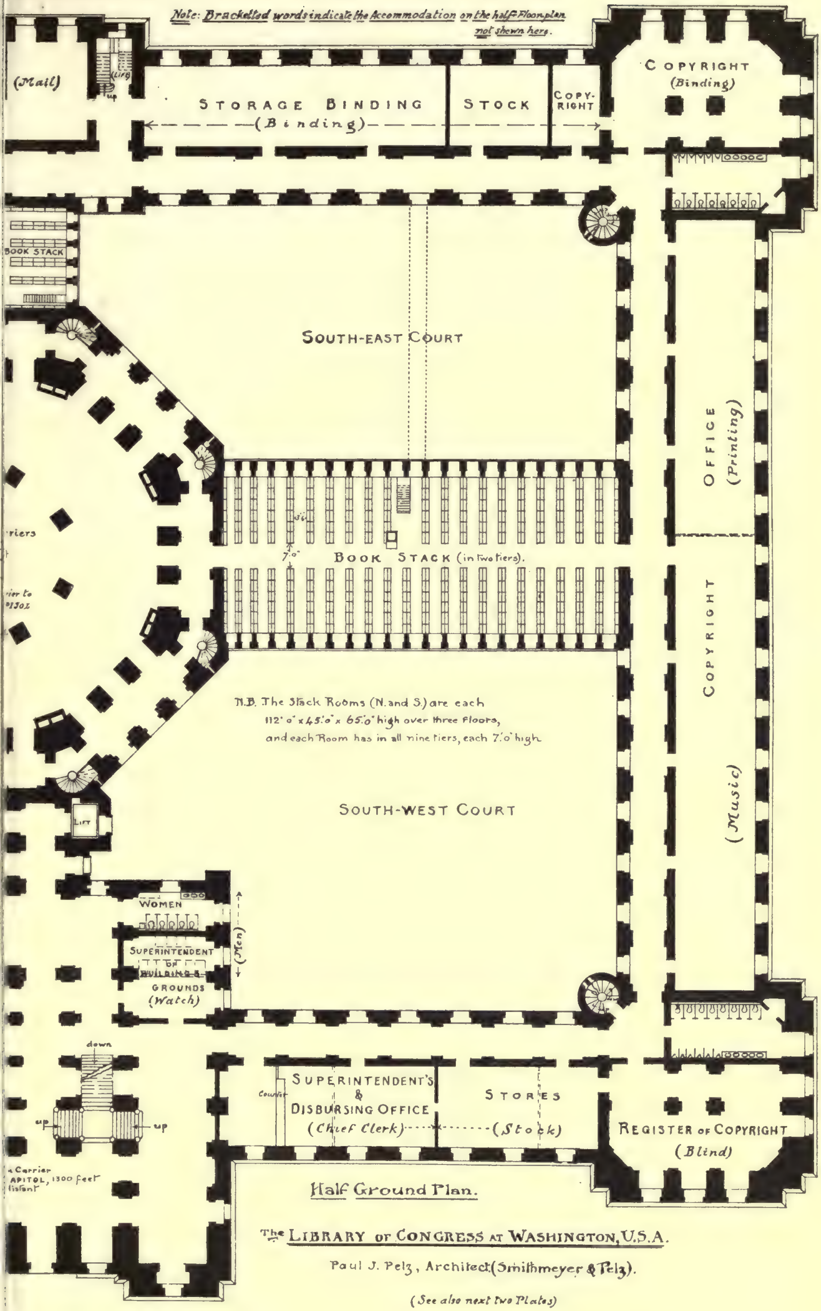
Henry T. Hare, F.R.I.B.A. Architect.

52^{2}



Half Basement Plan.

Plate XLVII.


Note: Bracketed words indicate the Accommodation on the half-Floor plan not shown here.
(Mail)
(Lift)
up
STORAGE BINDING
(Binding)
STOCK
COPY-RIGHT
COPYRIGHT
(Binding)
BOOK STACK
SOUTH-EAST COURT
OFFICE
(Printing)
riers
ier to
1302
7.0"
BOOK STACK (in two tiers).
COPYRIGHT
(Music)
N.B. The Stack Rooms (N. and S.) are each
112'0" x 45'0" x 65'0" high over three floors,
and each Room has in all nine tiers, each 7'0" high.
SOUTH-WEST COURT
LIFT
WOMEN
SUPERINTENDENT OF BUILDINGS & GROUNDS
(Watch)
(Men)
down
up
up
SUPERINTENDENT'S & DISBURSING OFFICE
(Chief Clerk)
Counter
STORES
(Stock)
REGISTER OF COPYRIGHT
(Blind)
Carrier
APITOL, 1300 feet
listant

Half Ground Plan.

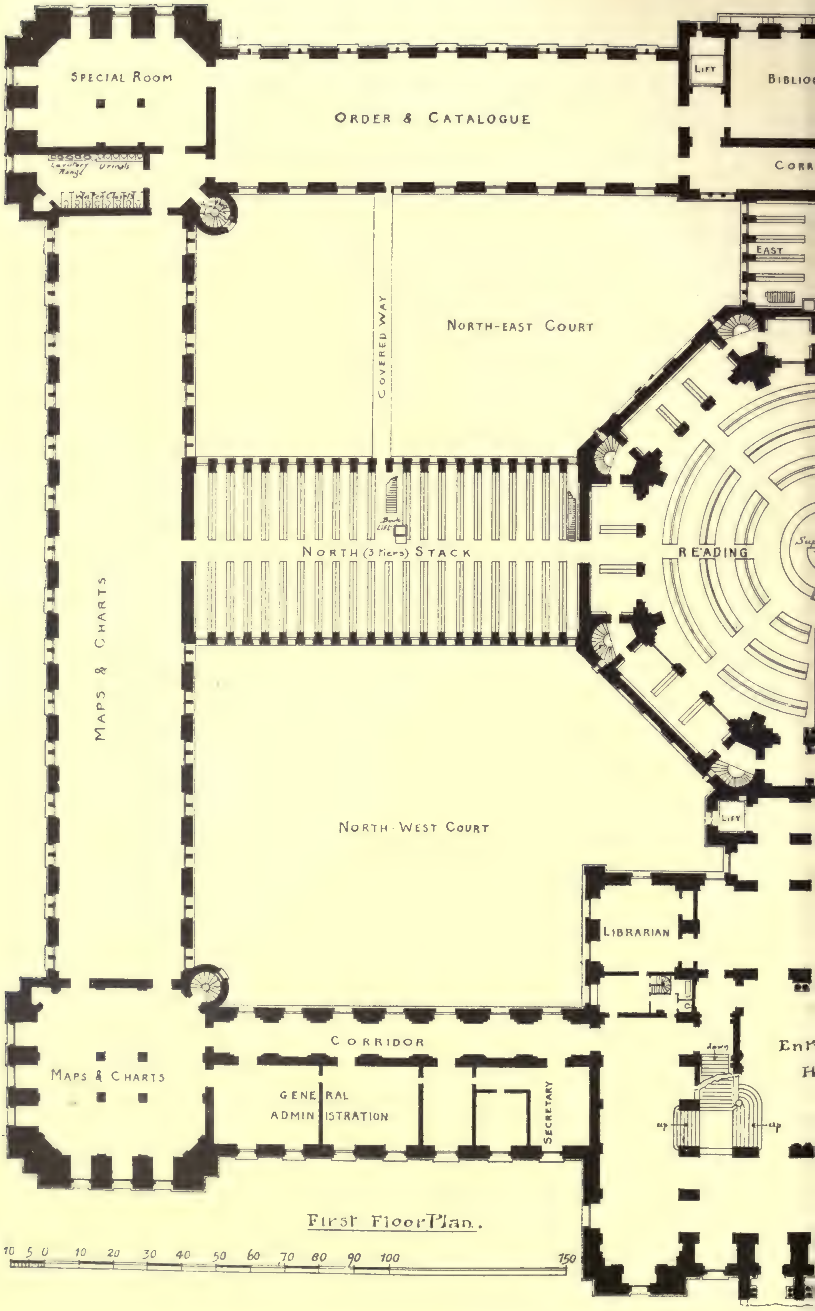
The LIBRARY OF CONGRESS AT WASHINGTON, U.S.A.

Paul J. Pelz, Architect (Smithmeyer & Pelz).

(See also next two Plates)

[*Between Plates XLVI. and XLVIII.*

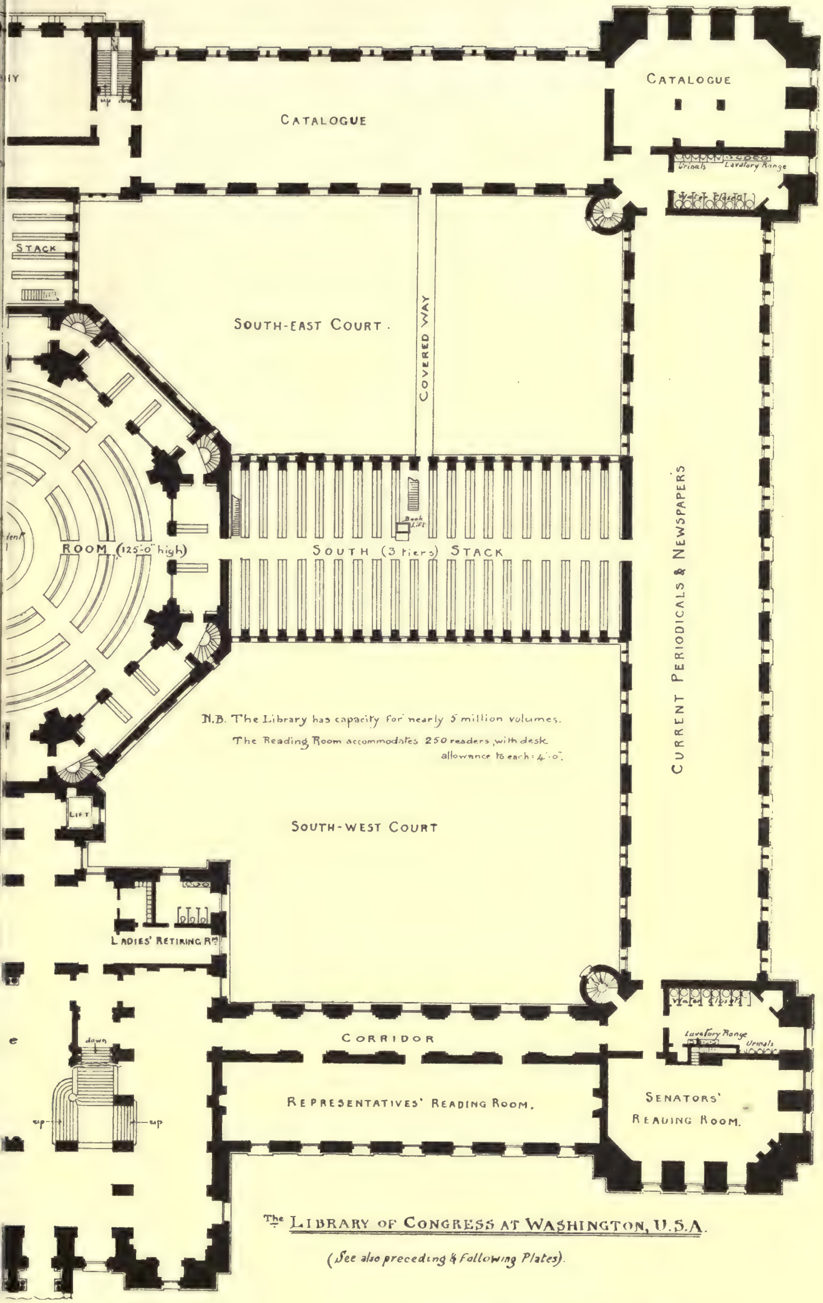
52^4



First Floor Plan.

52 5

Plate XLVIII.



N.B. The Library has capacity for nearly 5 million volumes. The Reading Room accommodates 250 readers, with desk allowance to each: 4'-0".

The LIBRARY OF CONGRESS AT WASHINGTON, U.S.A.

(See also preceding & following Plates).

[*Between Plates XLVII. and XLIX.*

52^{6}

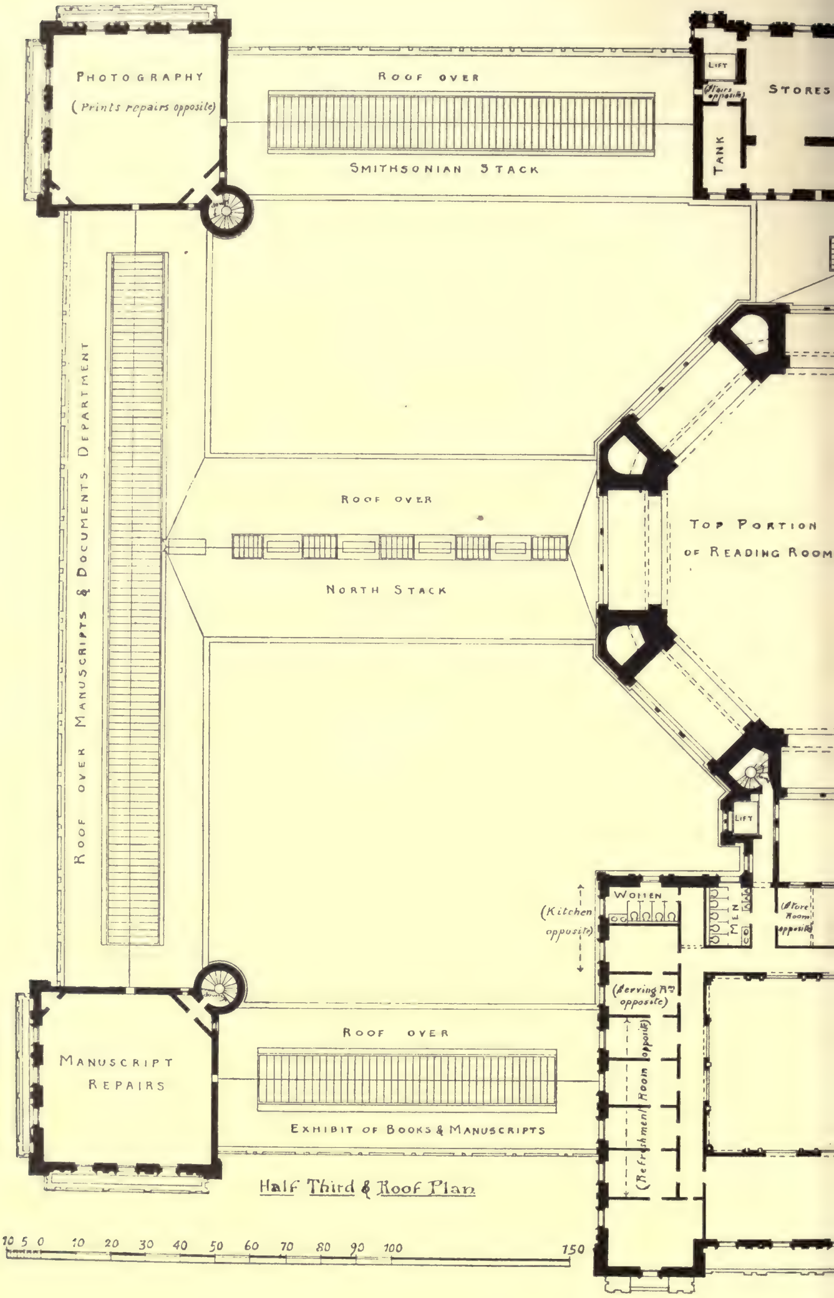
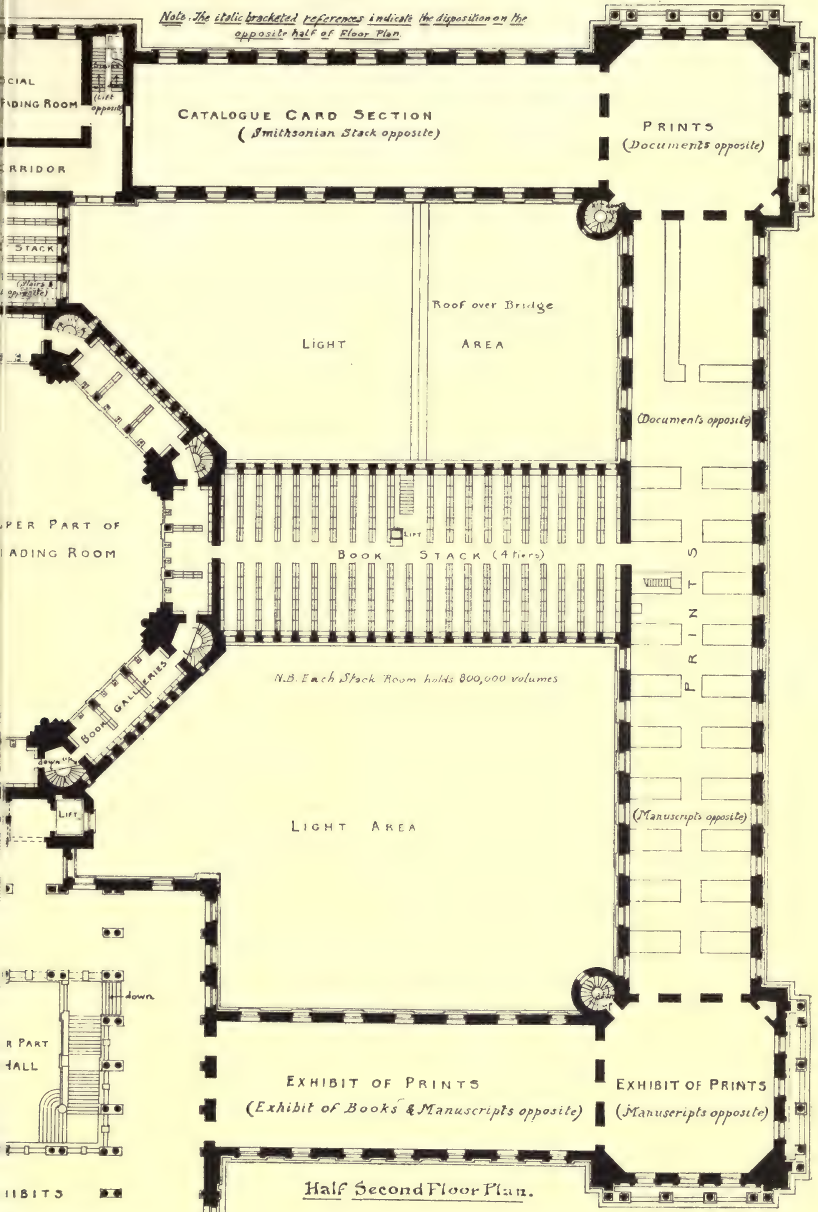

Half Third & Roof Plan

Plate XLIX

527



Half Second Floor Plan.

THE LIBRARY OF CONGRESS AT WASHINGTON, U.S.A.

Paul J. Pelz, Architect (Smithmeyer & Pelz).

(See also two previous Plates).

[*Between Plate XLVIII. and p.* 53.

blotting-pad; it is only the last three items that encroach on the desk, and not to any serious degree even then. These radiating desks seat 352 readers, and extra tables provide further accommodation for sixty.

A remark may be appropriate here with regard to the pernicious habit (or perhaps "practice" is the correct term) of using sham-book doors; there is not any excuse even on the score of symmetry, for the latter is more admirable when unshackled by the bonds of monotony. The British Museum is a bad sinner (and seemingly unrepentant) in this respect; its books number over two millions, and though this may not be considerable, yet it is sufficient to render such a pretentious provision uncalled for; it is true that the library shelves were designed when there was a smaller number of books, but it makes very little difference. The late Sydney Smirke was architect of this block, and it is probable that he had to submit to the realisation of ideas quite foreign to his own wishes.*

The notes elsewhere entered bearing on libraries in private houses have but modified (if any) application here, the conditions and requirements in private and public libraries being so different. On Plate XLV. is shown the older type of Public Free Library; on Plate XLVI. is illustrated an open-access modern library. Plates XLVII. to XLIX. illustrate the Congress Library at Washington, U.S.A.

Lunatic Asylum.—(*a.*) Central administration, sanitary requirements, classification of inmates, aspect, grouping, adequate lighting, prospect, panic requirements.

(*b.*) Receiving, waiting and discharging rooms; doctors', matron's, superintendent's (probably a doctor) and steward's rooms; dispensary, bedrooms, staff cubicles; patients' day rooms and night wards, dining and recreation halls, workrooms, bath-rooms, W.C.'s, &c.; chapel, infirmary, padded rooms, private rooms for patients, isolation hospital, mortuary; staff, mess and recreation rooms; kitchen, laundry and heating departments, workshops, bakery, stores, porter's lodge, &c. &c.

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* The open-access shelves of this reading-room house some 20,000 volumes. The total height of the cases is about 8 ft.

The pavilion system of planning is an excellent one, and with the administrative department centrally placed, and male and female departments right and left of same, the best results are obtained.

Private rooms (not less than 9 ft. by 7 ft. by a height of 11 ft.) should be provided for paying-patients.

Lunatic asylums should be planned with every regard to the provision of ample sunshine, light, air and ventilation, and cheerful prospects.

Dormitories should provide a minimum of 50 ft. super. per bed.

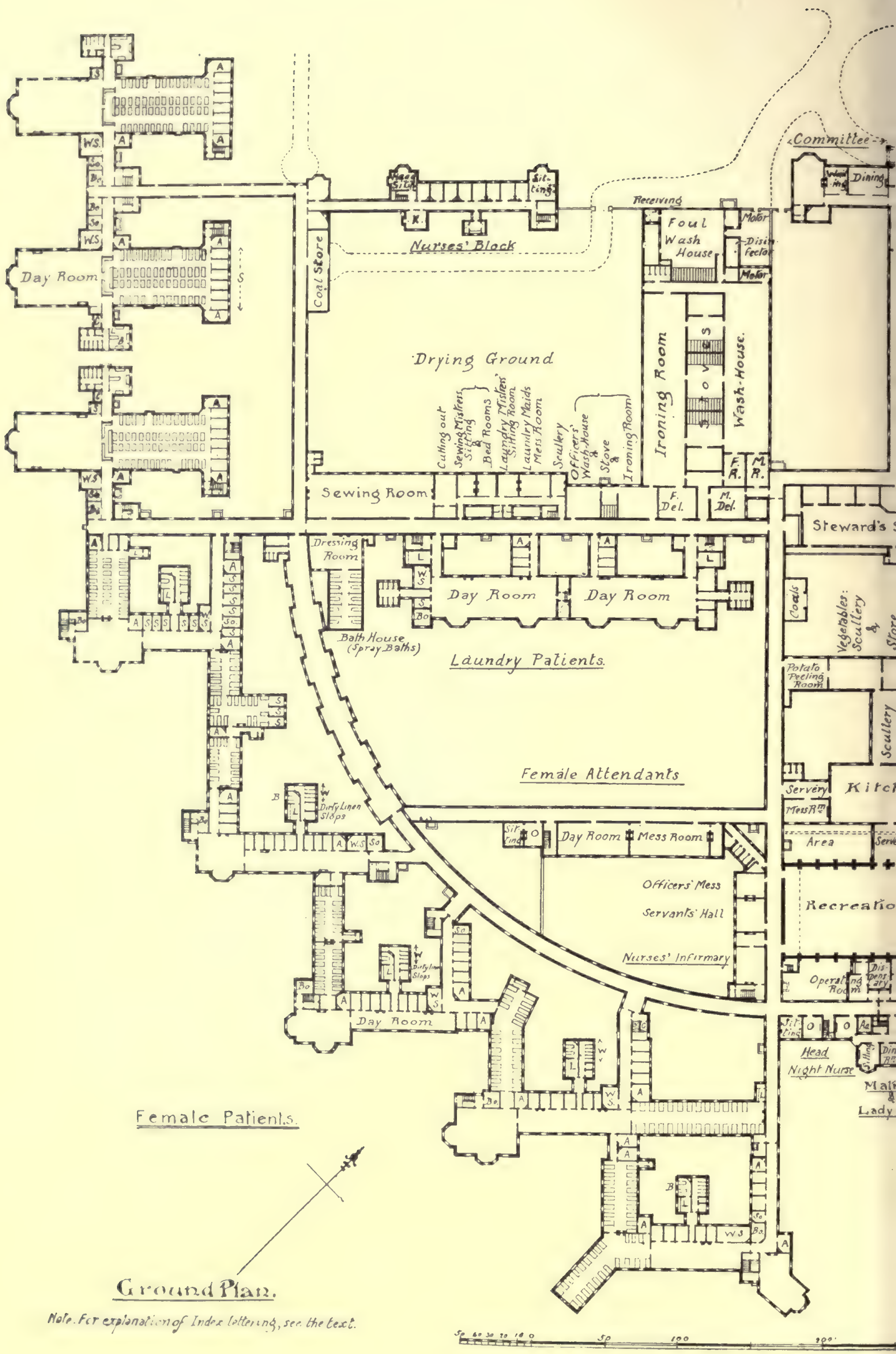
Each ward should have (*a*) an attached day-room, providing at least 20 ft. super. per patient, and facing, as far as possible, south to south-east. Also (*b*) room for two or more attendants, at an estimated area of at least 120 ft. per attendant.

Infirmary wards are to be calculated on an increased basis of individual accommodated, as compared with the other wards.

The chapel should provide seating for about 75 per cent. of the patients.

There must be ample security against the escape of any inmate; the boundary wall must be unscaleable, but should be rendered as inconspicuous as possible from the grounds of the asylum, so as to render the enforced restraint less irksome. To this end, it is advisable that this wall should take the form of a sunk fence, approached by a long slope with shrubbery well removed from the wall, but at the same time well grown. Thus the patients get an unobstructed view of the surrounding country from the asylum grounds. There should be but one entrance to the estate.

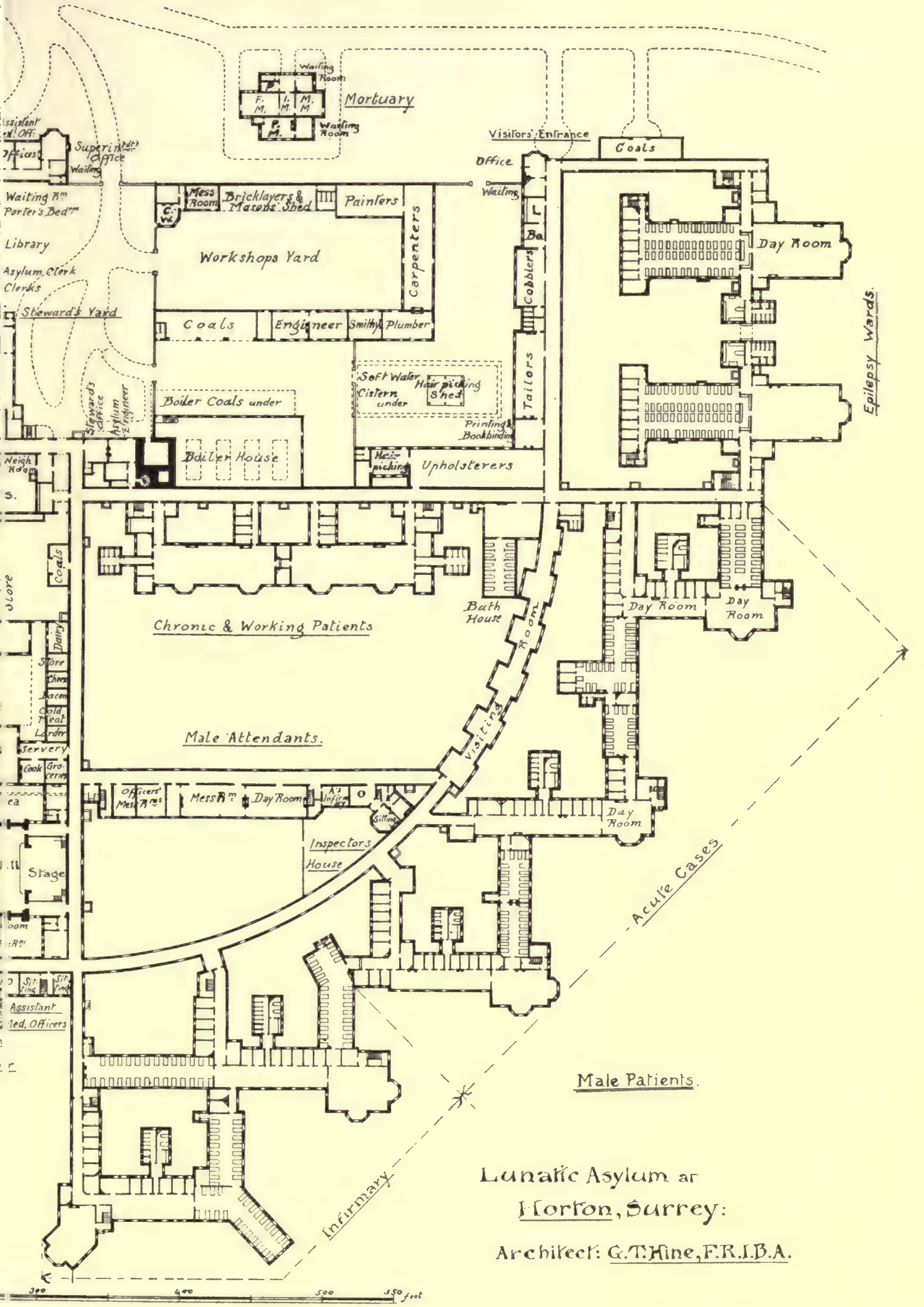
It has been noted that there should be ample supply of sunshine and light, but it is at the same time possible that some cases of insanity would be benefited by a restricted subjection



Ground Plan.

Note. For explanation of Index lettering, see the text.

Plate L. 54²



Lunatic Asylum at Horton, Surrey:

Architect: G.T. Hine, F.R.I.B.A.

[*Between pp.* 54 *and* 55.

to the sun's influence. Violent cases of mania, for example, would be by some doctors recommended for subdued treatment. One of these medical gentlemen, who had charge of an asylum, carried out this principle to the utmost. Certain rooms were decorated with blue wall-hangings, others with bright red, and others with green, and so on. It was considered that violent patients, on being confined in rooms decorated in blue, would gradually get "the blues," which phrase is habitually used to give the impression of total lack of excitement on the part of anyone suffering from such an attack. Victims of melancholy madness would be housed in rooms decorated in bright red, evidently with the intention that their mood should be changed to one which would incline them to start out and "paint the town red." The green-decorated rooms would be for imbeciles and lunatics generally, as the effect of this colour is restful. This system, it will be seen, is not in any way accordant with Hahnemann's homeopathy, which has so much to recommend it for ordinary purposes; and though the above scheme sounds very plausible, it is the medical and not the architectural profession, that must decide on its merits or demerits.*

For the plan of a lunatic asylum see Plate L., which gives a design by Mr G. T. Hine, and it is of interest to note that the Bexley Heath Asylum is a replica of the one at Horton.

The following are the references for initial letters on the Asylum plan :—

A.	Attendant.
Aa.	Area.
B.	Bath.
Bo.	Boots.
C.	Coals.
C.W.	Clerk of Works.
F. Del.	Female Delivery Room.
F.M.	Female Mortuary.
F.R.	Female Receiving-room.
I.M.	Inspection Mortuary.
K.	Kitchen.
L.	Lavatory.
M. Del.	Male Delivery Room.
M.M.	Male Mortuary.
M.R.	Male Receiving-room.
O.	Office.
P.	Porter.
P.M.	Private Mortuary.
S.	Single Bed Ward.
So.	Store.
W.	Water-closet.
W.S.	Ward Scullery.

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* The hospital for the insane at Alessandria in Italy has introduced this system of treatment.

Market.—(*a.*) Numerous in preference to spacious stalls; good roadways; efficient accommodation for the public and for market goods; good lighting.

(*b.*) Market-hall (divided into stalls, and having efficient gangways and roadways); public weighing machines, superintendent's offices, covered accommodation for carts; cellars, ice-houses; lairages and pens for the animals; space for offal; lavatories, &c.

The specific accommodation required in a market building depends naturally on the nature of the goods to be disposed of. It will be simplifying matters, for the purposes of this work, to make notes of a provincial general market. There would be stalls for the sale of meat, fish, poultry, dairy produce, vegetables, fruit, flowers, hardware and crockery, drapery, toys, &c. Meat and fish stalls are by preference to be disposed along the outer perimeter of the building, the central portion thus being reserved for goods less likely to damage the dresses of the public. In connection with the meat shops and fish stalls there should be refrigerating chambers; these meat shops would be large enough to permit marketers to walk within and select their purchases more comfortably; 12 ft. by 12 ft. is a good size. The stalls may reasonably be disposed in double rows, rendering it easy to convert two into one, should any tenant require additional space. By this means, even if double rent has to be paid, there is greater economy of service for the stallholder, than by renting two separated stalls, and there is of course the benefit of facing two avenues; one large stall is also more effective than two smaller. Each division has thus a minimum area of 6 ft. by 6 ft.

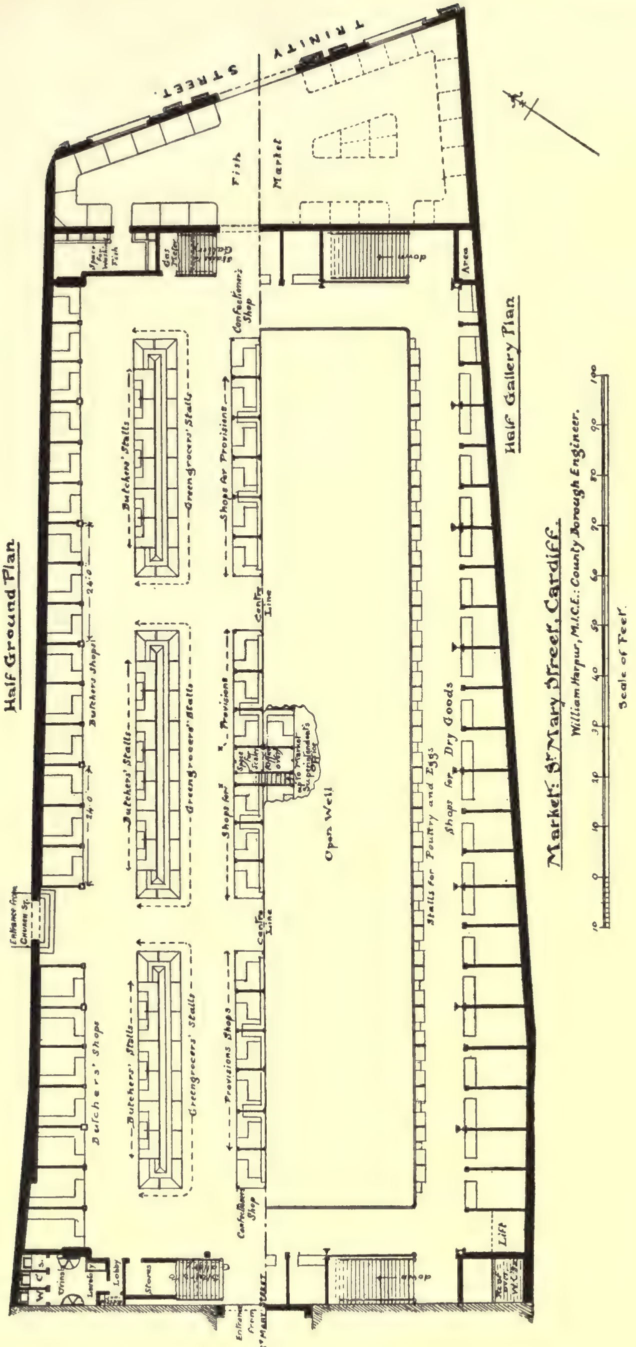
The following specimen dimensions may be of interest:—

The width of cart avenues in Sheffield Market = 27 ft.

The width of cart avenues in Smithfield (London) Poultry Market = 21 ft. 6 in.

The size of stalls in Wakefield Market is 10 ft. by 3 ft. 6 in. The cattle pens are 18 ft. by 15 ft., and the sheep pens are 10 ft. by 6 ft.; they are arranged by communicating gates into suites of from four to six pens.

Plate LI.

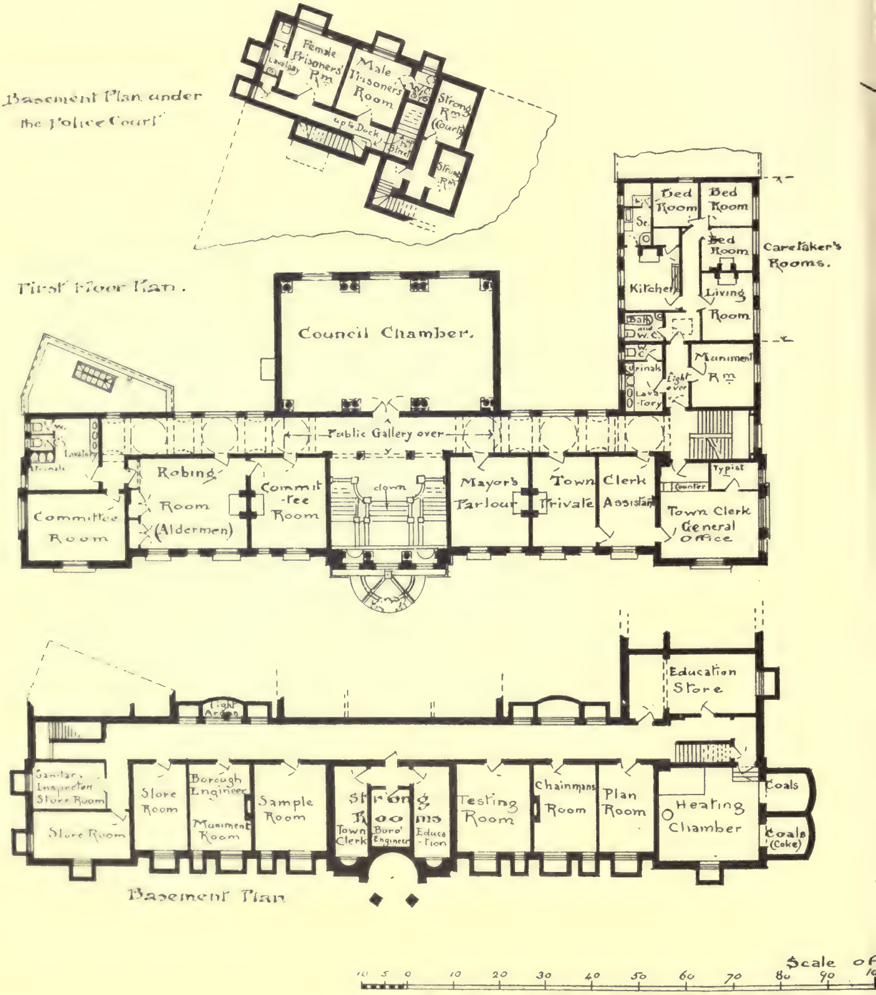


Market: St Mary Street, Cardiff.

William Harpur, M.I.C.E.: County Borough Engineer.

MUNICIPAL BUILDINGS & COUNTY & PETTY SESSIONS COURT, BROMLEY, KEN

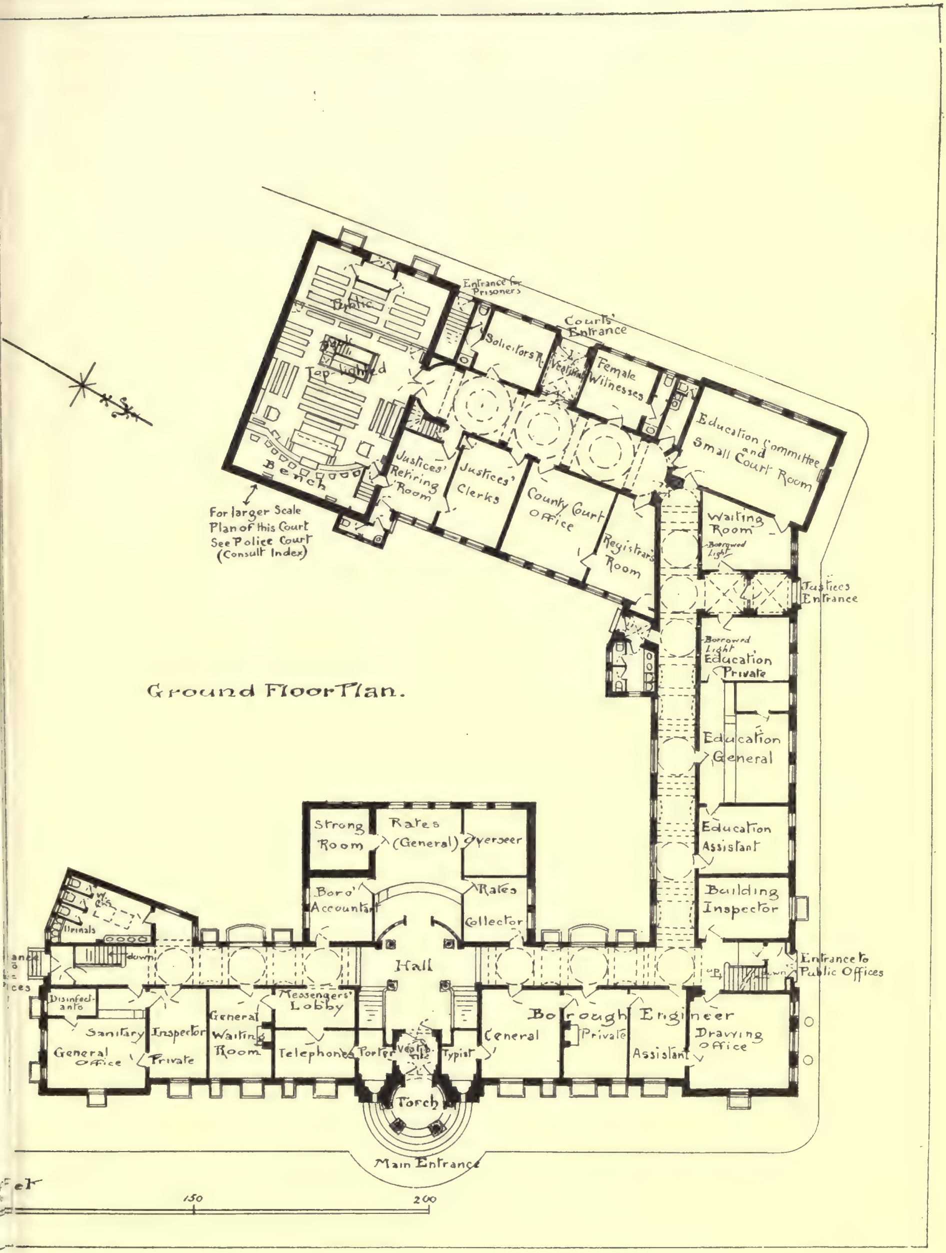
Architect: R. Frank Atkinson F.R.I.B.A.


Basement Plan under the Police Court

First Floor Plan.

Basement Plan

Plate LII.



[*Between Plate LI. and p.* 57.

Live-animal markets require lairages and pens for the animals as their special features. Abattoirs are sometimes met with in this connection also, and the action of public bodies in providing these is gradually coming into favour.

For plans see Plate LI., a design by Mr W. Harpur, County Borough Engineer of Cardiff; he kindly supplied the following notes:—"The gallery shops and stalls have proved unworkable generally throughout the country, the ground floor having to accommodate all classes of goods. The butchers' shops would be better if fitted as two to each 24 ft. bay instead of three to the bay."

Mortuary and Coroner's Court.—(*a.*) Seclusion; perimetral zone between mortuary buildings and boundary of site; ventilation, lighting, aspect.

(*b.*) Mortuary chambers for infectious and non-infectious bodies, shell store, post-mortem room, laboratory, inspection rooms with viewing windows, disinfector, destructor, chapel, stables, van sheds, coroner's court, coroner's room, witnesses' room, lavatories and W.C.'s, offices, caretaker.

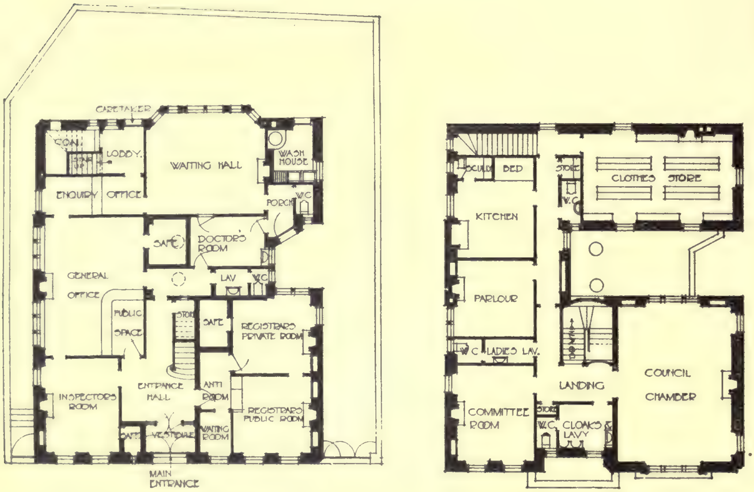
The infected mortuary and infected van shed should, together with the destructor, be kept entirely separate from other buildings. There may also be a disinfector.

The coroner's court may be about 35 ft. by 18 ft.

The provision for mortuaries suggested by the Local Government Board is much less elaborate than as noted above, and reference should be made to the Model Bye-laws relating to mortuaries, with a model plan attached (Reprinted 1905).

Municipal Buildings.—(*a.*) Good inter-communication of departmental offices, good lighting, seclusion of strong-rooms, grouping, and (if the buildings are on a large scale) dignity of plan, spacious corridors, adequate entrances, axial planning for the benefit of public service, lighting.

(*b.*) Council-chamber and committee-rooms, mayor's and deputy-mayor's parlours, mayor's ante and reception rooms, waiting-room, room for journalists, town-clerk's and deputy town-clerk's private offices, town-clerk's department (consisting of clerks' offices, waiting, telephone and typewriting rooms, and strong-rooms); other departments will have similar accommodation. There should be ample W.C., lavatory and cloaks' provision for each department. An assembly-room suite is a frequent requirement. The medical officer's department would have clerks' offices and laboratory. The surveyor's and engineer's departments would each require plan room and contractors' room and drawing-offices in place of the ordinary clerks' offices. Corporation and staff luncheon-rooms, and kitchen department.



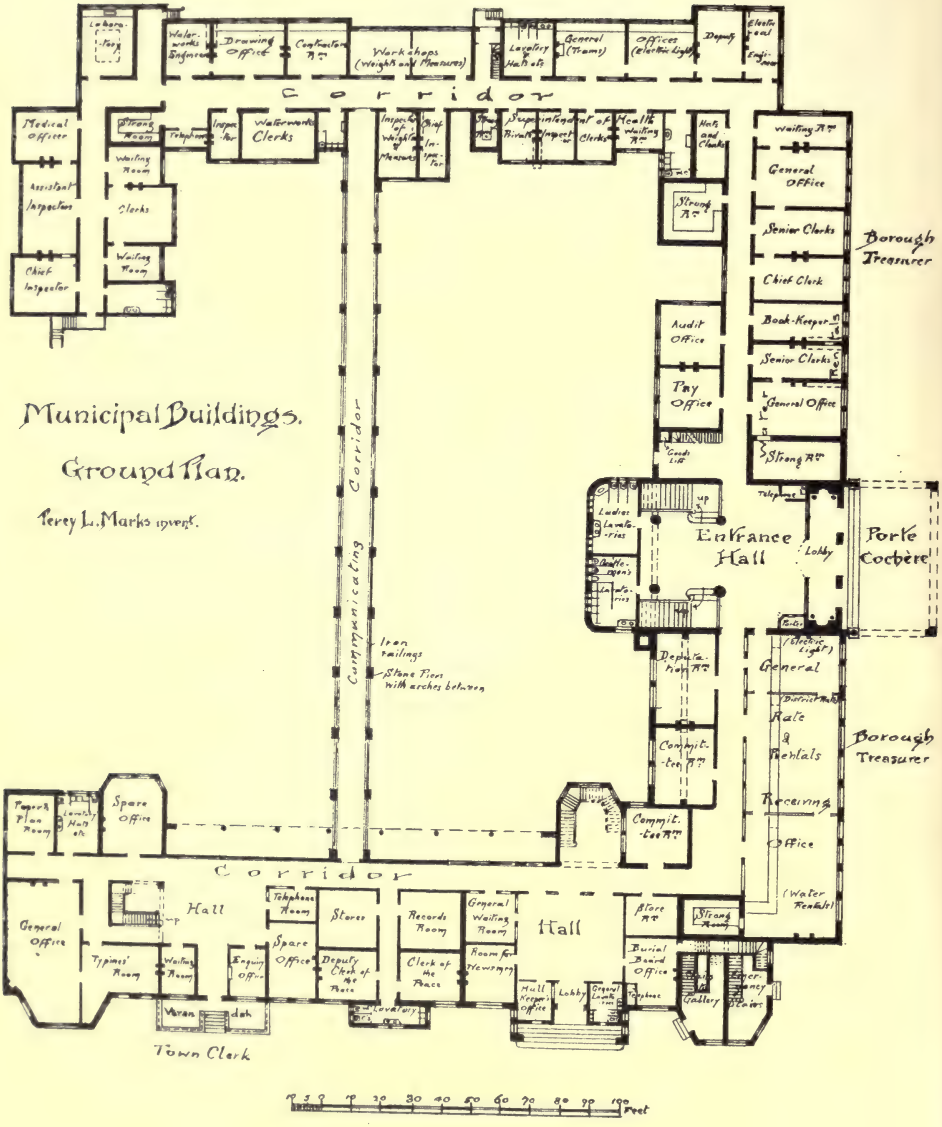
GROUND FLOOR. FIRST FLOOR.

FIG. 13.—PARISH COUNCIL BUILDINGS, HAMILTON, N.B.

Alex. Cullen, F.R.I.B.A., *Architect.*

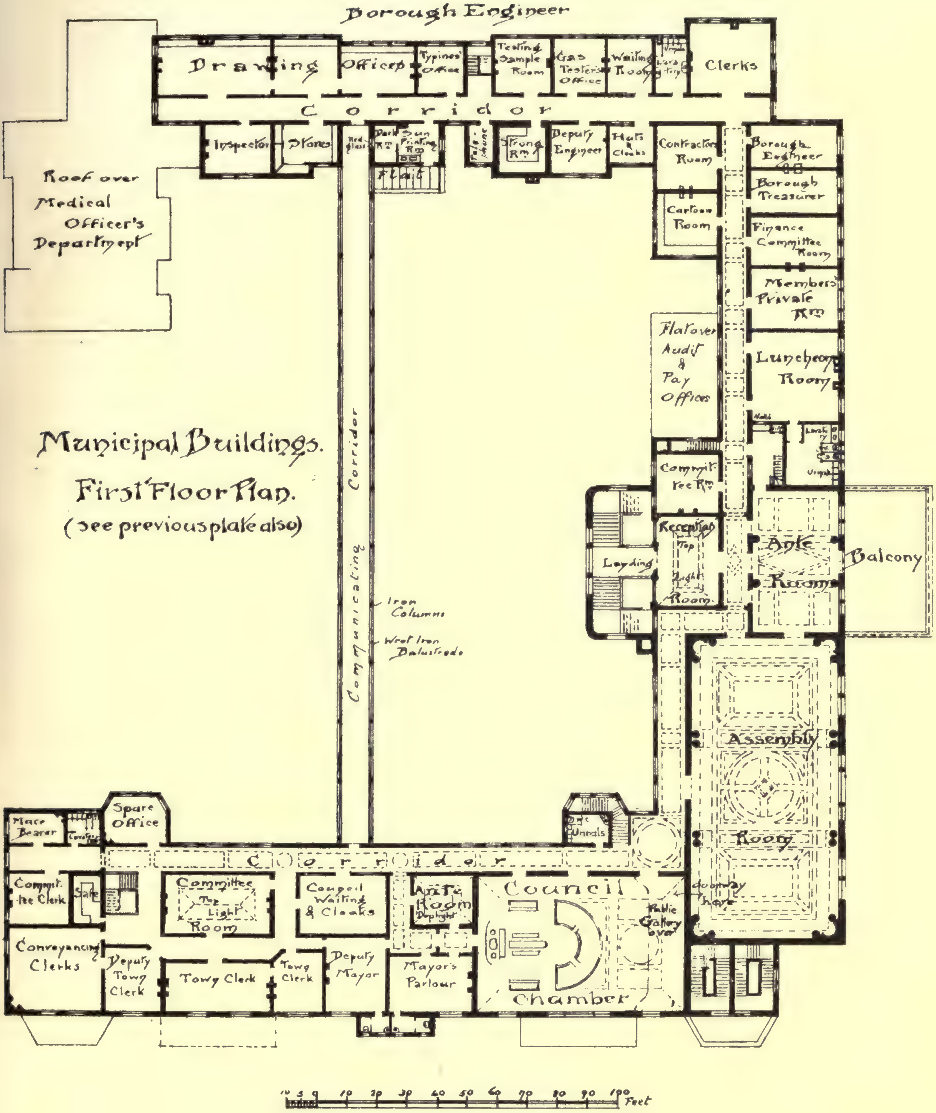
Reduced Scale of 32 feet to an inch.

Plate LIII.


Municipal Buildings.
Ground Plan.
Percy L. Marks invent.
Laboratory
Waterworks Engineer
Drawing Office
Contractors Rm
Workshops (Weights and Measures)
Lavatory & Hats etc
General (Trams)
Offices (Electric Light)
Deputy
Electrical Engineer
Corridor
Medical Officer
Strong Room
Telephone
Inspector
Waterworks Clerks
Inspector of Weights & Measures
Chief Inspector
Superintendent of Private
Inspector
Clerks
Health Waiting Rm
Hats and Cloaks
Waiting Room
Assistant Inspectors
Clerks
Waiting Room
Chief Inspector
Strong Rm
Waiting Rm
General Office
Senior Clerks
Chief Clerk
Book-Keeper
Senior Clerks
General Office
Strong Rm
Borough Treasurer
Audit Office
Pay Office
Goods Lift
Telephone
Ladies Lavatories
Gentlemen's Lavatories
up
Entrance Hall
Lobby
Porte Cochère
Porter
Communicating Corridor
Iron railings
Stone Piers with arches between
Deputation Rm
Committee Rm
Committee Rm
(Electric Light)
General
(District Rate)
Rate & Rentals
Receiving Office
(Water Rentals)
Borough Treasurer
Paper & Plan Room
Lavatory Hats etc
Spare Office
Corridor
General Office
Hall
Typists' Room
Waiting Room
Enquiry Office
Verandah
Town Clerk
Telephone Room
Spare Office
Stores
Deputy Clerk of the Peace
Records Room
Clerk of the Peace
General Waiting Room
Room for Newsmen
Lavatory
Hall
Hall Keeper's Office
Lobby
General Lavatories
Store Rm
Burial Board Office
Telephone
Strong Room
Stairs
Gallery
Emergency Stairs
0 5 10 20 30 40 50 60 70 80 90 100 Feet

58²

Plate LIV.



Municipal Buildings.
First Floor Plan.
(see previous plate also)

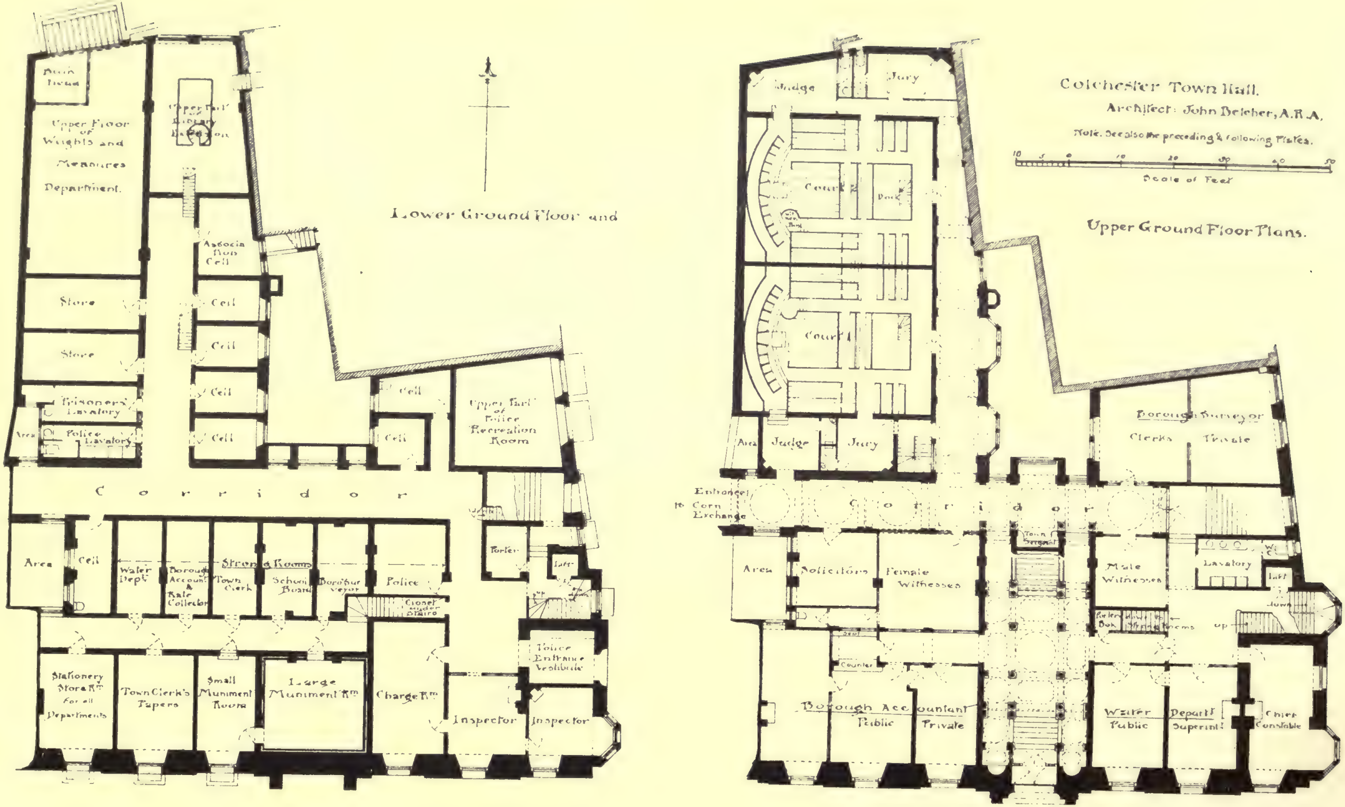
58^{3}

Plate LV.

Colchester Town Hall.

Architect: John Belcher, A.R.A.

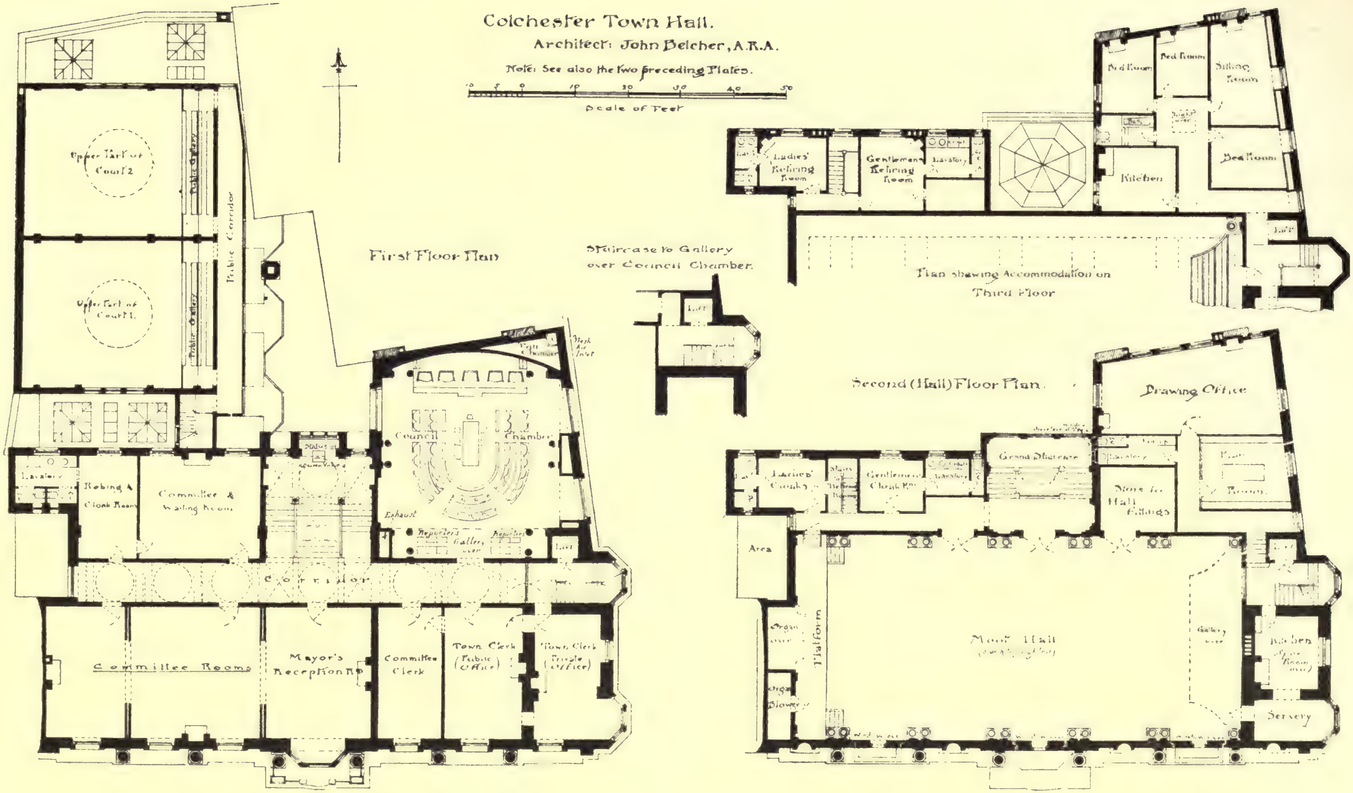
Note. See also the preceding & following Plates.



Lower Ground Floor and Upper Ground Floor Plans.

584

Plate LVI.



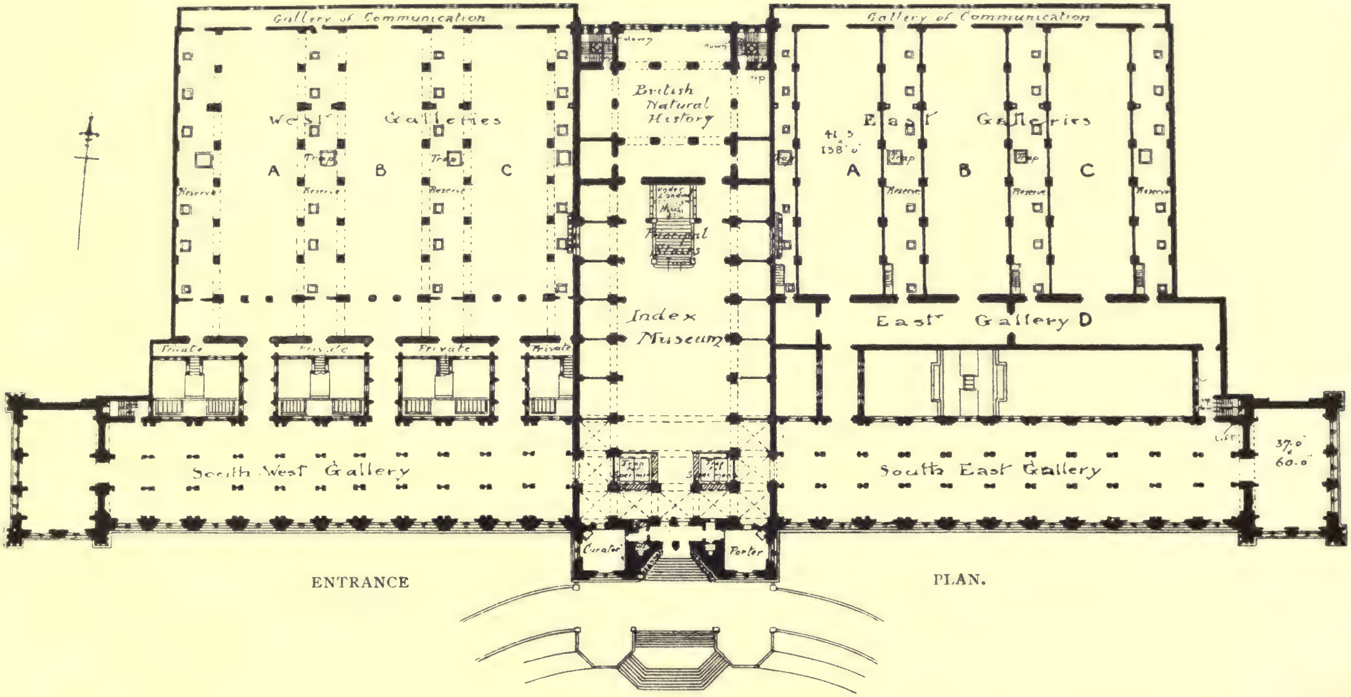
Colchester Town Hall.

Architect: John Belcher, A.R.A.

Note: See also the two preceding Plates.

58^5

Plate LVII.



THE NATURAL HISTORY (BRITISH) MUSEUM, LONDON.

Architect—ALFRED WATERHOUSE, R.A.

Reduced Scale—96 feet to 1 inch.

The public when attending the municipal meetings would be accommodated in a gallery to the Council chamber. As regards this chamber, the unit of accommodation is the seating area per councillor, and this should be provided for on a generous scale; in regard to the offices generally, there is not any specific maximum or minimum size in such buildings. Plate LII. shows municipal buildings for a borough on the outskirts of London, whilst the plans given on Plates LIII. and LIV. are adaptations from a scheme submitted in competition and will serve to illustrate municipal requirements on an extended basis. Very simple schemes suffice for small boroughs. An interesting example of a provincial town hall for a population of about 40,000 is that erected at Colchester (Essex) from the design of Mr Belcher, R.A., and illustrated on Plates LV. and LVI. On Fig. 13 is shown an interesting little building for Parish Council purposes.

Museum.—(*a.*) Ample floor-space, good lighting, efficient supervision, symmetry of plan, storage accommodation, good means of circulation for the public.

(*b.*) Plenty of museum accommodation (including floor-space for show-cases and wall-space for charts, diagrams and pendant objects, &c.); curator's offices, delivery and packing rooms, stores, lifts, W.C.'s and lavatories, porter's room, and residence for caretaker.

In planning these buildings it is to be borne in mind, that ample gangway should be allowed both for easy transit of the public and for the shifting of show-cases, &c., as there may be from time to time a transfer of objects to other museums; and from other causes a permanent stationary arrangement is infrequent. There must also be comfortable space for examining objects, without being jostled by passers-by. The delivery and packing rooms should be of good size, so as to give plenty of elbow-room and to minimise the chances of breakages.

The floor area should be as little encumbered as is possible with constructional supports, and by the use of iron and steel this is easily managed. Lighting should be ample, and by preference should be both from the sides and the top ; but the former should be at a higher level than the position for hanging objects, otherwise valuable space is lost for museum purposes.

On the other hand, strong side-lighting has been recommended for the general exhibition of specimens, which would then be suitably brought out into the room in a series of vertical cases at right angles to the window-walls, the cases being set back to back, thus forming bays. This is a method largely employed at the Natural History Museum (see Plate LVII.). There should be an Index museum near the entrance ; this will serve as a suitable introduction to the objects contained in the collection. Good ventilation is a necessity if only on account of the preparations used for insecticide.

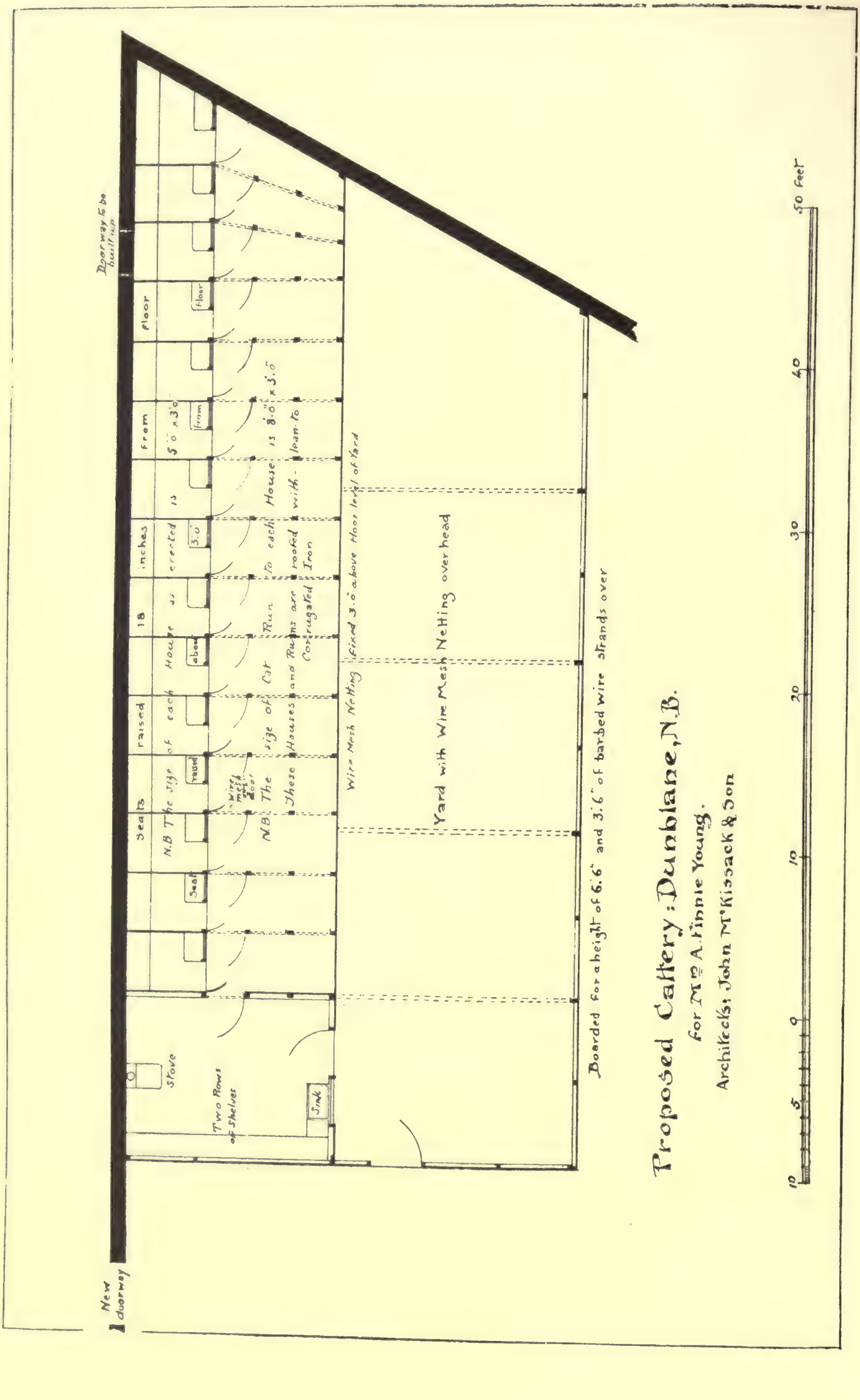
It is generally recommended that museum galleries should not exceed 32 ft. in width, where lighted by side windows only.

Outbuildings.

Cattery.—It may be supposed that this is more often required now than when this book was first written. The requirements in accommodation are shelters (or houses) and "runs." Where stud-cats are kept, each of course has a separate house and "run" ; but for all ordinary purposes one "run" and shelter answer. These should be roomy, carefully built so as to provide ventilation without draughts and should be dry ; means of artificial heating by night and in cold weather are generally advocated. The shelter should have the floor well above the ground level, but the boards should be loose for easy removal. Two or more shelves should be fitted, as cats like to make themselves comfortable at different levels. In the "run," part of the ground should be finished with mould, part with grass, and part may be cemented or asphalted. Forked stumps of trees in the "run" are a desideratum for the same

60'

Plate LVIII.


Doorway to be built up
floor
from
5'0" x 3'0"
Floor
from
is
inches
erected
3'0"
18
House
above
raised
each
Seats
N.B. The size of each House is erected 18 inches raised from floor
raised
Seat
wire mesh door
N.B. The size of each House is 8'0" x 3'0"
Cat Run to each House
These Houses and Runs are roofed with lean-to Corrugated Iron
Wire Mesh Netting fixed 3'0" above floor level of Yard
Yard with Wire Mesh Netting over head
Boarded for a height of 6'6" and 3'6" of barbed wire strands over
Stove
Two Rows of Shelves
Sink
New doorway
10
0
5
10
20
30
40
50 Feet

Proposed Cattery: Dunblane, N.B.

for Mrs A. Finnie Young.

Architects: John McKissack & Son

Outbuildings: Cattery (Continued).

reason as are shelves in the house. The "run" should be enclosed on the sides and top with two thicknesses of small-mesh wire netting, kept apart some 4 in. to 6 in., so as to obviate the chance contact of the home cats with vagrants. An "Infirmary" house would be required in a large cattery. A plan of a cattery is given on Plate LVIII.

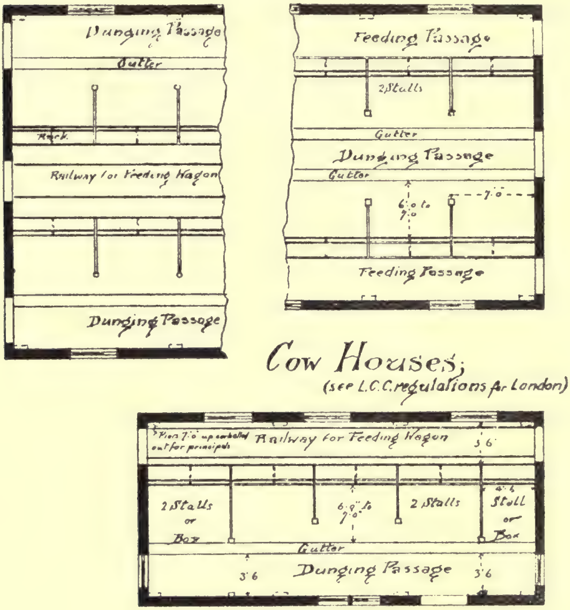


FIG. 14.

Cow-house.—Primarily, it may be noted, that in London, the County Council has issued Bye-laws under the Public Health Act of 1891, regulating the erection of such houses—a highly necessary act of legislation, as it has a direct bearing on the bills of mortality. Some dimensional sketches (Fig. 14) are appended showing different types of houses, and it is only requisite to note otherwise, that it is permissible to house two cows in one stall (if the regulation width be given) and it is

Outbuildings: Cowhouse (Continued).

likewise *en règle* to have a double row of stalls, with a choice as to position of feeding and dunging passages. Bye-laws under the Public Health (1875) Act are issued by many of the extra-metropolitan authorities for the regulation of dairies, &c.

Bales, *i.e.*, poles suspended at each end from short chains, are often substituted for partitions between stalls, being placed between every two animals in the byres.

Cycle-house.—This is customarily a weather-boarded or a matched-boarded shed, the basis of accommodation being of course the size of the cycle. The following dimensions will be useful:—

	Inside Dimensions.				
	Ft.	In.		Ft.	In.
A house to hold one bicycle will suffice at	6	3	by	2	0
„ „ two bicycles „	6	3	„	3	6
„ „ one tricycle „	6	3	„	4	0

The floor of the house may advisedly be raised 2 in. or 3 in. clear of the ground, as a preventative against damp inside; but at the same time the space beneath should be well ventilated, or the result desired will not be ensured.

Dog-kennels.—These are planned either in the form of "boxes," *i.e.*, association houses, or else as single hutches. Dogs, being hardier by nature than are cats, do not require their houses to be artificially heated, but draughts should be avoided. Each "box" and yard suffices at 36 ft. superficial area severally. Separate hutches vary of course with the species of animal, but the requirements range from about 2 ft. 6 in. to 12 ft. super. per dog in hutch, and the floor should be raised a few inches from the ground. The floor of the yard should be hard and impervious, and the enclosure should be iron fencing; but this will be merely required as a vertical enclosure, the top being left open. There should be an "infirmary" also.

Outbuildings (*Continued*): ***Farmsteads.***

(*a.*) Economical disposition of buildings and good grouping, intercommunication between buildings of any one group, aspect, labour-saving improvements, good drainage.

(*b.*) Buildings required depend upon the kind of farm, whether for tillage, grazing, stock, dairy, poultry or fruit, &c. Stabling for cattle, horses (draught and other kinds), sheep houses and pig-sties; yards and shelters; cart sheds, implements and repairing sheds; stores for grain and other produce; manure sheds and liquid manure tanks; threshing-machine and chaff-cutting machine sheds; engine-house, boiler-house, guano store, mash and root boiling houses, stack-yard, straw-barn, mess-room, sanitary conveniences, &c.

A great feature in the planning of farms is the consideration of economising labour in every possible direction, not only by the introduction of modern machinery, but also by so grouping and arranging the various buildings and sheds, that the minimum of time will be occupied in the various processes. Thus it is considered advisable that the straw-barn should be placed as centrally as possible, as straw is the bulkiest article on a farm and has to be distributed daily throughout the various buildings devoted to animals. In close contiguity will be the stack-yard and the threshing-house, the latter holding a middle position; the reason is that from the stack-yard, where the unthreshed straw is deposited, the latter will be taken to the threshing-machine and thence stored in the straw-barn.

The subject of farmsteads is of far too extended a nature to admit of detailed treatment here, or indeed of anything but the merest outline sketch; and those who desire extended information should consult books dealing specially with the subject, but the accommodation allotted to horses, cattle, sheep and pigs will be found elsewhere in this chapter (under "Outbuildings," &c.); it may, however, be stated here, that whilst in their disposition the buildings for housing the animals should be protected in the quarter from which storms may proceed, the aspect generally advised is the south-east.

The water-supply should be plentiful and of good quality; and good drainage, both of the buildings and of the land, should be laid down.

Fruit Room.—(*a.*) Very restricted lighting and external ventilation; good circulation of air round the fruit; absence of artificial heating.

(*b.*) Batten shelving along the sides. Perhaps part of the ground space to be manured for mushroom growing. If the roof-timbers are exposed, they will serve for the suspension of herbs, strings of onions, &c.

The walls should be of ample thickness, 1 ft. 6 in. being a good minimum, the floor being paved with stone. It has been recommended that white deal should be the timber employed, any wood charged with turpentine being carefully avoided.

The effects of variations of external temperature should be guarded against; consequently the area of glass and of opening casements should be very restricted, and furthermore the fruit-room (whose use is merely for storing) will be benefited by receiving but a modicum of light, and this more especially when mushrooms are to be grown therein. But through-ventilation should still be provided by the insertion of small hinged casements, set opposite each other in the end walls. This ventilation is mainly for carrying off the moisture given out by the fruit, but during frosty weather the openings would be securely packed.

Open batten shelving should be used, so as to secure a free circulation of air about the fruit.

Granary.—(*a.*) Freedom from humidity, good ventilation, inaccessibility to vermin, cool temperature.

(*b.*) Bucket elevator; receiving hoppers; garner or grain-cleaning apparatus; weighing machine; grain

Outbuildings: Granary (Continued).

storage bins (naturally or artificially ventilated); storage for flour, meal, hay, straw, &c.

In designing these buildings, it is very necessary to provide against the presence of weevils and other vermin; and to this end, different precautions must be taken. The grain should be stored in island bins, for the free circulation both of air and of cats; if supported on columns, this admits of the circulation of air-currents beneath also. Brick floors are considered undesirable.

Where the granaries are built of wood, they should be raised 3 ft. to 4 ft. from the ground level and supported on piers (cylindrical by preference), having broad caps projecting sufficiently to prevent vermin creeping up and finding entrance into the building. The use of resinous substances is beneficial to this end.

In London the employment of brass wire close-mesh partitions has averted the depredations of mice. Perforated iron is also used for bins.

Grain is stored to a depth of 2 ft. to 3 ft. and should be frequently turned, so as to aid the drying and prevent the accumulation of vermin.

A method of ventilation employed is to drive cool air through a central perforated iron tube; or the buildings may be provided with loopholes about 5 in. square, carried on piers. But, as a rule, granaries are ventilated by means of swing windows, placed as high as possible and facing each other, wooden louvre boards being sometimes substituted; of course, the air passing through the cracks of the weather-boarding is insufficient for the purpose.

The above methods are for ventilated granaries; but there is another system, consisting in the exclusion of air, the buildings being then known as grain silos. It is a closed pit, either above or below ground; in the former case, air is sometimes forced through. In the case of granaries above ground, the corn would be filled in at the top and discharged through hoppers at the bottom.

Outbuildings: Granary (Continued).

Bins are from 12 ft. to 14 ft. square and from 40 ft. to 90 ft. deep. The storeys of the buildings average 9 ft. to 10 ft. in height, but 8 ft. will suffice. Bin walls in reinforced concrete may be as little as 4 in. or 5 in. in substance.

A few remarks on a granary barn may be of use. For economising labour and preventing waste from each process of dealing with the husks, it is necessary that large farm carts should be able to be drawn into the barn; but as too great a sacrifice of space would be involved in turning the carts about, there must be a cart thoroughfare with the exit opposite the entrance. Hence it follows that the barn must be isolated on two opposite sides. The most economical plan is to provide a central gangway for the carts, thus permitting them to unload right and left. The doorways should be some 12 ft. vertical area in size.

Motor-Car House (Garage).—(*a.*) Carriage sweep by entrance, aspect, lighting, petrol storage, provision for repairs.

(*b.*) Car-house with pit and work-bench, or work loft over. Washing-yard, W.C., petrol store, cupboards, &c.

The dimensions of a house for a small car should be not less than 12 ft. by 22 ft.; an increase in the number of cars should be met by an increased width (rather than depth) of shed, with a doorway for each car; these doorways should be not less than 9 ft. high to allow for the passage of a loaded car.

Where a large garage is concerned, it will, however, be necessary to store cars in rank and file; and allowing at least 2 ft. clearance on each side of the car, it will still be advisable to introduce some passing-places (gangways); for though this entails the sacrifice of some space for housing, yet it provides far less disturbance in getting out cars from the rear rows.

The pit (for working in beneath the car) is now losing vogue, a portable gallery being frequently substituted, consisting of two run-blocks each 1 ft. to 1 ft. 6 in. wide and about 2 ft. 6 in. high, approached by an inclined plane. Where, however, *Outbuildings : Garage* (*Continued*).

the pit is desired, it should be about 2 ft. 9 in. by 6 ft. with a raised curb (or combing) 3 in. or 4 in. above the floor, to prevent the car from meeting with a mishap ; the depth of the pit would be about 4 ft.

A sunny aspect is considered most undesirable ; and as abundant light is required in a car-shed, north and east should be sought for. The washing-yard may be advantageously covered by a roof, glazed northwards ; this provides a good diffused light and renders the washing of the cars independent of weather. Artificial light, good ventilation, and heating by means of pipes are also required.

There must be a working bench, either in the car-shed itself or in a loft over, and numerous shelves, lockers and cupboards are desirable.

Hoisting-tackle for raising portions of the car should also be fitted up.

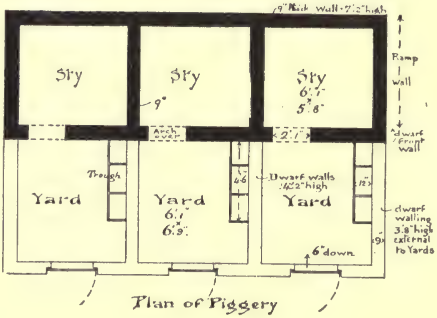


FIG. 15.

It is necessary to provide sufficient space in front of the house, to admit of turning the car freely in all directions.

Piggery.—Opinions differ apparently as to housing swine on the separate or the associated system. The accompanying illustration (Fig. 15) shows the former method. It is considered advisable for the buildings to be set on higher ground than the house, and to be kept to the east, with the drainage falling away from the dwelling. The model piggery will provide for a swing-flap along the top of the feeding trough, so that the food can be supplied without entering the yard. A "box" of 80 ft. superficial area will house a sow and litter.

Outbuildings (*Continued*): *Poultry House.*

(*a.*) Aspect, ventilation, separation of breeds, external means of inspecting nesting boxes.

(*b.*) House with sparred ladder and with perches for roosting upon, nesting boxes, food store, stove.

South to south-east aspect is recommended, and warming by steam or water is beneficial, warmth being essential both for the laying of eggs and the rearing of chickens.

Perches should not be placed one immediately over another. Each breed of fowls must be separately housed.

The following approximate dimensions will be useful :—

A house 4 ft. by 4 ft. will accommodate 12 fowls.
„ 5 ft. „ 5 ft. „ „ 20 „
„ 6 ft. „ 5 ft. „ „ 35 „

and this gives room also for nest-boxes inside.* A sketch of a fowl-house is given in Fig. 16. The fowl-houses are also made level with the ground, the latter forming the base of the house, as in the run.

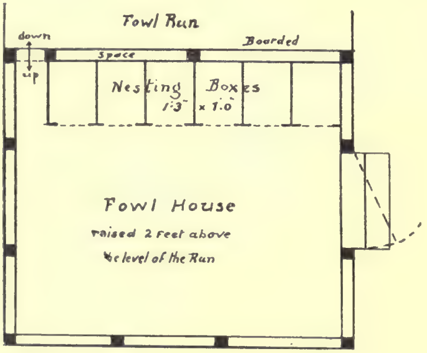


FIG. 16.

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* A correspondent in *The Daily Telegraph*, some time since, recommended the following from personal experience (the original stock being of seven black Minorca pullets and one cockerel) :—" A wooden house 6 ft. long, 5 ft. wide and 5 ft. high, with a run 12 ft. by 6 ft. ; the run was dug out a foot, and 6 in. of brick rubbish, then 3 in. of coal-cinders, and over that 3 in. of cockle-shells were laid, so that with a rake over once a week, the run was always perfectly sweet."

Outbuildings: Poultry House (Continued).

Ridge ventilation is often employed.

If ducks are kept, duck-pens, pond and yard are requisite.

Stables and Coach-houses.—(*a.*) Lighting, spaciousness, grouping, aspect.

(*b.*) Stalls for nags, hunters, carriage-horses, visitors' steeds, &c.; loose and sick boxes; washing-box (or space) for horses; covered washing space for carriages; coach-house (or houses); harness-room, mess-room, tack-room, coachman's rooms; loft for corn and hay with bins (fodder store); stable-yard with dung-pit; W.C. (or E.C.), &c.

It will be understood that the accommodation scheduled above is only necessary in its entirety in large hunting stables. The requirements will be modified for other establishments.

Theoretically only loose-boxes would be provided; but exigencies of space and money prevent the realisation of such an ideal.

For stalls the customary dimensions are 6 ft. wide in clear by 9 ft. 6 in. deep over heel-post; this depth is at times, however, increased. The stall divisions are usually 2 in. thick. A passage 6 ft. to 8 ft. wide (or more) should traverse the whole length of stall accommodation. Loose-boxes and sick-boxes are habitually 10 ft. by 12 ft., but in these cases also the dimensions are at times increased. In connection with sick-boxes there would be a copper for the preparation of bran-mash; these boxes should be treated after the manner of "isolation hospitals," *i.e.*, they should be secluded.

It has been estimated, that each animal should have a minimum floor space (inclusive of share of gangway) 120 ft. super. in area, though this exceeds the usual provision. Racks and mangers vary in width from 15 in. to 20 in. Stable doors are usually 4 ft. wide. If the hay and corn are stored in a loft, shoots will be formed, and a corn-meter fitted to the corn-shoot.

Outbuildings: Stables, &c. (Continued).

A coach-house should be, as a minimum size, 10 ft. by 18 ft.; it is inadvisable that the depth should be increased for the purpose of housing carriages tandem, for should a large number require accommodation, it is well either to have a series of houses or else to range the carriages side by side. Coach-house doors (usually hung in pairs) require a width of at least 8 ft.; these doors are not infrequently made to slide, instead of opening outwards. Very rarely do carriages or coaches exceed 14 ft. in length when the shafts are raised.

The following notes will be useful:—

12 cub. ft. of fresh air per minute per horse are recommended.
4 gallons of water (minimum) per horse per day for drinking.
10 „ „ per horse for washing.
9 „ „ per small carriage for washing.
16-20 „ „ per large carriage for washing.

For the manure-hole, 10 cub. ft. per horse per day suffices.

A harness-room should be cool and dry and should have an open fire-place and cupboards.

In large establishments the hollow-square or quadrangular treatment of plan is effective, and it is also economical from a service standpoint. All corners, internal and external, should be well rounded, so as to minimise the chances of unpleasant abrasion. For important stables a boy's sleeping-room is desirable, having glazed partitions and commanding all the stables. On Plate LIX. are given plans of stables by Mr R. W. Edis.

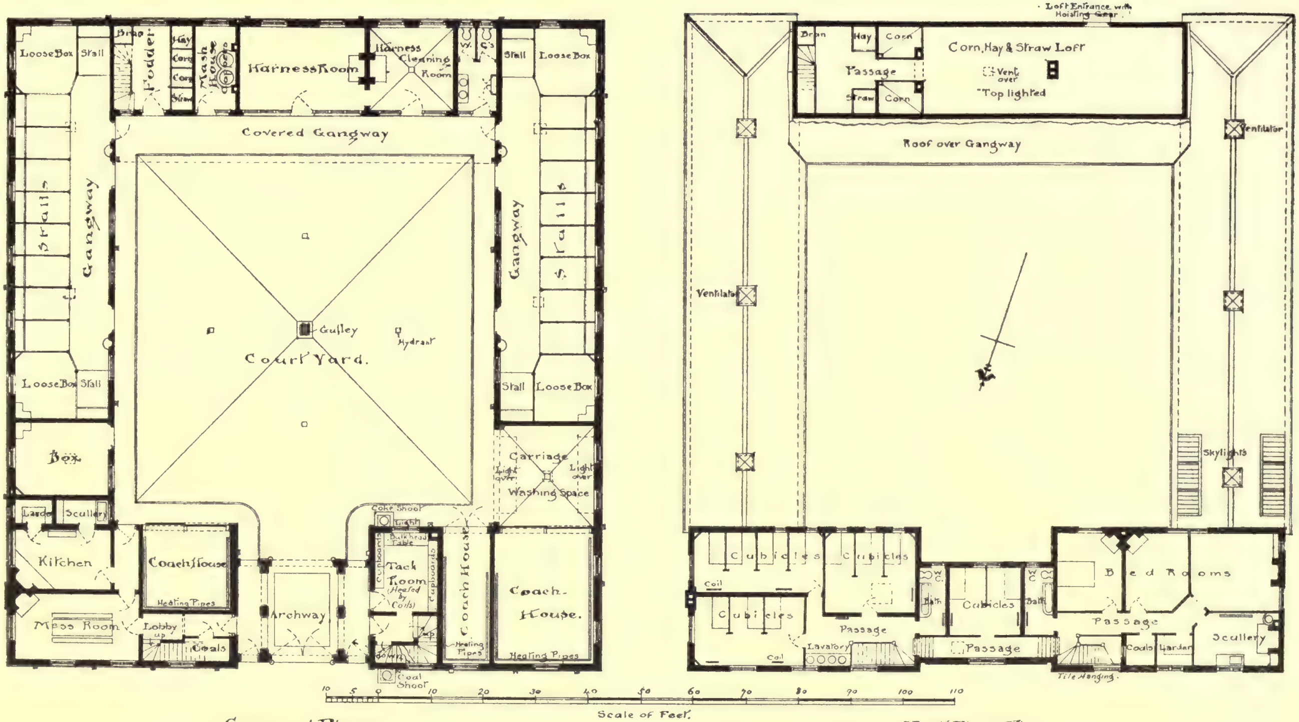
In cart-horse stables, bales (see "Cow-house") are substituted for stall divisions. Stalls for cart-horses are made 7 ft. or 7 ft. 6 in. wide.

Palace, Royal.—(*a.*) Spaciousness and stateliness, grouping, prospect, aspect, symmetry, dignity of plan, special exits.

(*b.*) Various suites of state apartments, banqueting chamber, picture-gallery, music-room, &c.; private suites for sovereign, guests and establishment; business

Plate LIX.

Stables for the late Sir J. Blundell Maple Bart.
at Childwick Bury, St. Alban's.
Architect: R. W. Edis, C.B., F.S.A.



Ground Plan

First Floor Plan.

department (containing secretarial and clerical offices, postal, telegraph, despatch and telephone offices, strong-rooms, &c. &c.), waiting-halls, pages' and messengers' rooms, library, chapel, &c.; kitchen and laundry, heating and lighting departments, stores, guard-house, stables department, &c. &c.

Palaces should be planned on a generous scale, though not infrequently the accommodation in past years has been very inadequate. Whilst the accommodation mentioned or implied above would be essential in all properly equipped buildings of this nature, there might be additional provision at option, such as armoury, museum, theatre, &c. Special exits and escape stairs should be provided, seeing the large number of people that will be housed in a palace.

Parliament Houses.—(*a.*) Acoustic requirements of legislative chambers, dignity of plan, good lighting, ample provision of committee-rooms, accommodation for the public and the Press.

(*b.*) Legislative chambers (with their division and entrance lobbies and public and Press galleries), numerous committee-rooms, private suite for head of State, residence for Speaker of each House, library (and librarian's residence), ministers' private rooms, deputation and waiting rooms; coffee, luncheon, &c. rooms; smoking-room, newspaper and writing room; postal and telegraph department, telephone-rooms, typewriting and clerical offices, strong and records rooms; kitchen and other service departments, rooms for chief officials, &c. &c.

The planning of such buildings should be on a generous scale, both on account of their national importance and also because of probable periodical increases in representation, necessitating increased area. In some Council chambers each member has table as well as bench accommodation; but in a large legislative chamber, though the principle still holds good, it is not always allowed to hold sway, on account of the great increase in area it would entail. Top lighting is preferable by day and diffused artificial lighting in the evenings.

Picture Palace.—See under "Theatre, Cinematograph."

Piggery.—See under "Outbuildings."

Police Court and Station.—(*a.*) Good and secluded communication between Court (or charge office) and cells, and secluded position of latter and of detectives' room; accommodation for the public and the Press in the Court.

(*b.*) The accommodation for Court-houses would be one or more Courts, magistrates' room, offices, waiting-room, solicitors' room, cells, consultation room for prisoner and counsel, lavatories, &c.

(*b.*) The accommodation for stations would be inspectors' office, charge and clerks' offices, cells and airing yards, combination rooms, waiting-rooms, parade-ground, stabling, lavatories, stores, residential quarters for police.

The accommodation above noted is regulated by the stated requirements in each case, and, as regards the United Kingdom, is under the jurisdiction of the Prisons Department of the Home Office. A pamphlet is issued by the department, and, in conjunction with some illustrative sheets of plans, it contains some very useful and interesting information. A portion of one of those plans is given in Fig. 17.*

Polytechnic and Similar Institutes.—(*a.*) Good accommodation in lecture-rooms, class-rooms, laboratories and workshops; good lighting; efficient corridors and staircases; requirements for entertainments and general social purposes.

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* See also Plates III. and LII. for a magistrate's Court.

(*b.*) Class and lecture rooms, laboratories and workshops; balance-room, preparation room, library; great hall (with platform); smaller hall or halls (with moveable platforms); recreation, club and refreshment rooms, gymnasia; cloaks, lavatories, W.C.'s; heating, mechanical and lighting departments; director's, secretary's and instructors' rooms, stores, &c.

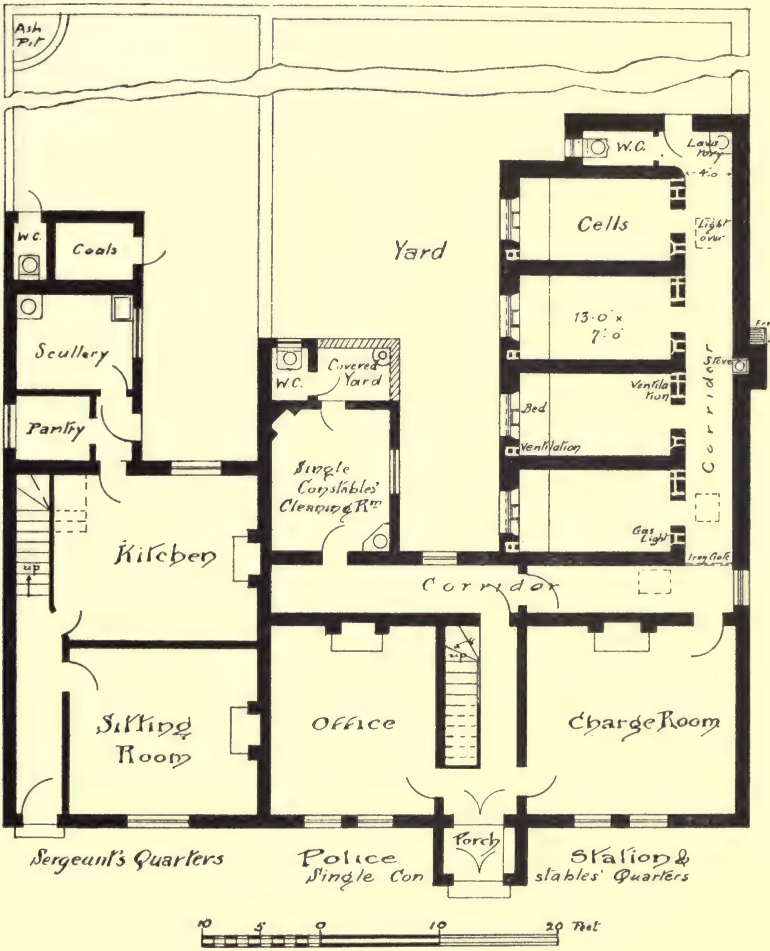

FIG. 17.

The actual basis of accommodation varies naturally with the individual room, though in every case where the main apartments are under consideration, the basis bears reference to the requirements of the scholar as unit.

A laboratory requires to be well ventilated, fully lighted and of generous dimensions. M. Guadet* indeed affirms that it can never be too well lighted, can never be lighted sufficiently, can never be sufficiently ventilated. The aspect should be north, a diffused light being advisable, where the use of the microscope is entailed; and as in these circumstances the student should be as near the window as possible, a practically designed laboratory will be a long, shallow room, lighted only on the north side or with north roof-light. But where the laboratory is orientated, then it should be wider, with windows along the east and west walls and a partition screen along the centre of the room, so that the students can be working on that side of the laboratory where the sun is absent.

The noxious fumes from chemical experiments are carried off by special flues and passed through furnaces or over fires, so as to consume all that is objectionable.

The physics laboratory is often placed in contiguity to the lecture theatre, with a curtain covering the opening and hiding the experiment table and the furnace hood. By this method the assistant can prepare the experiments whilst the professor is speaking, and when ready, the curtain is drawn and the experiment is carried out, without the attention of the class having been distracted by the preparations having been made in the open.

Light from behind the lecturer is inadmissible. The exits from laboratories must be well arranged, more particularly in view of the dangerous experiments at times conducted. In lecture halls, it is well to allow five persons to 20 sq. ft. of floor area, including in this for passageway and allowing to each person a small desk. For a small hall, however, more generous treatment may be allowed—say four persons to 20 ft. or even 24 sq. ft.

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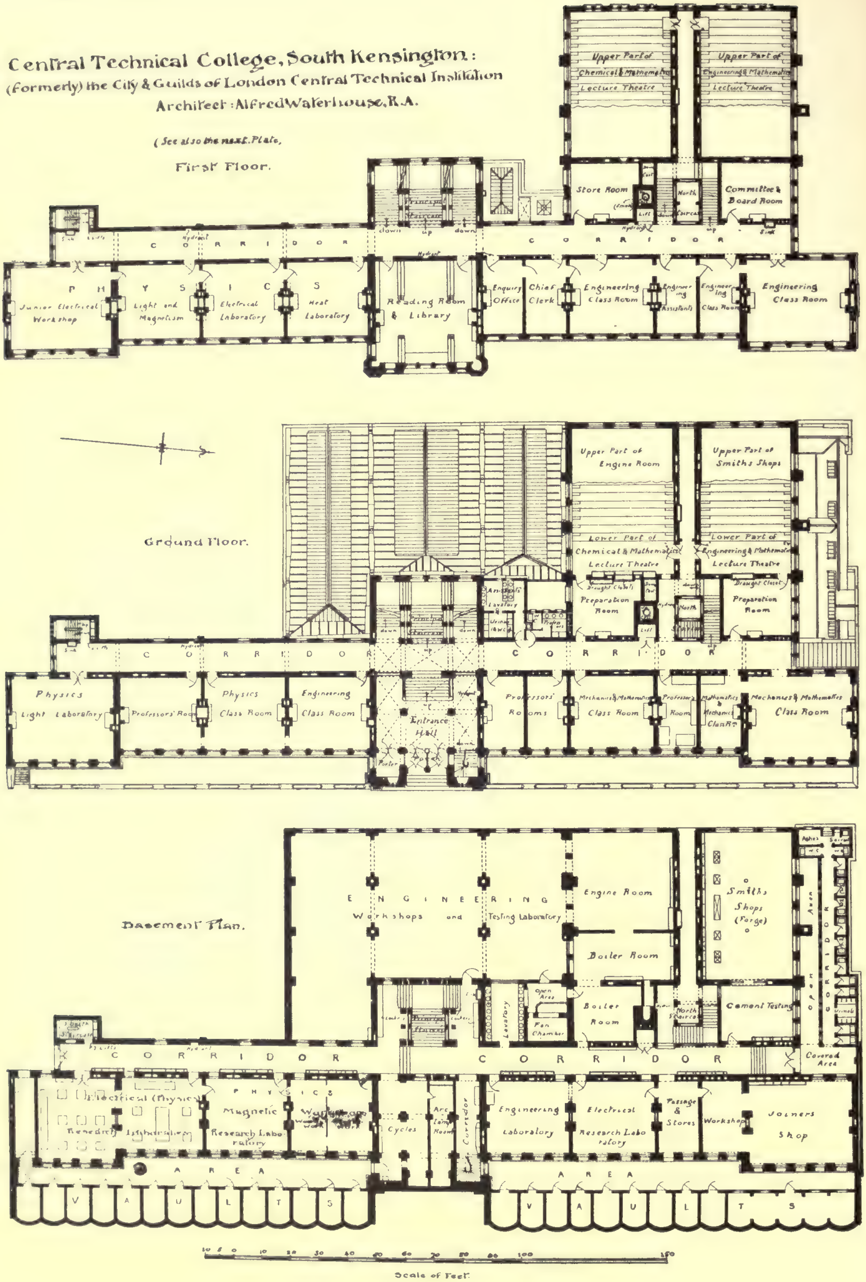
* "Elements et Théories d'Architecture."

Plate LX.

The Central Technical College, South Kensington:
(formerly) the City & Guilds of London Central Technical Institution
Architect: Alfred Waterhouse, R.A.

(See also the next Plate.

First Floor.



Ground Floor.

Basement Plan.

Scale of Feet.

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Plate LXI.

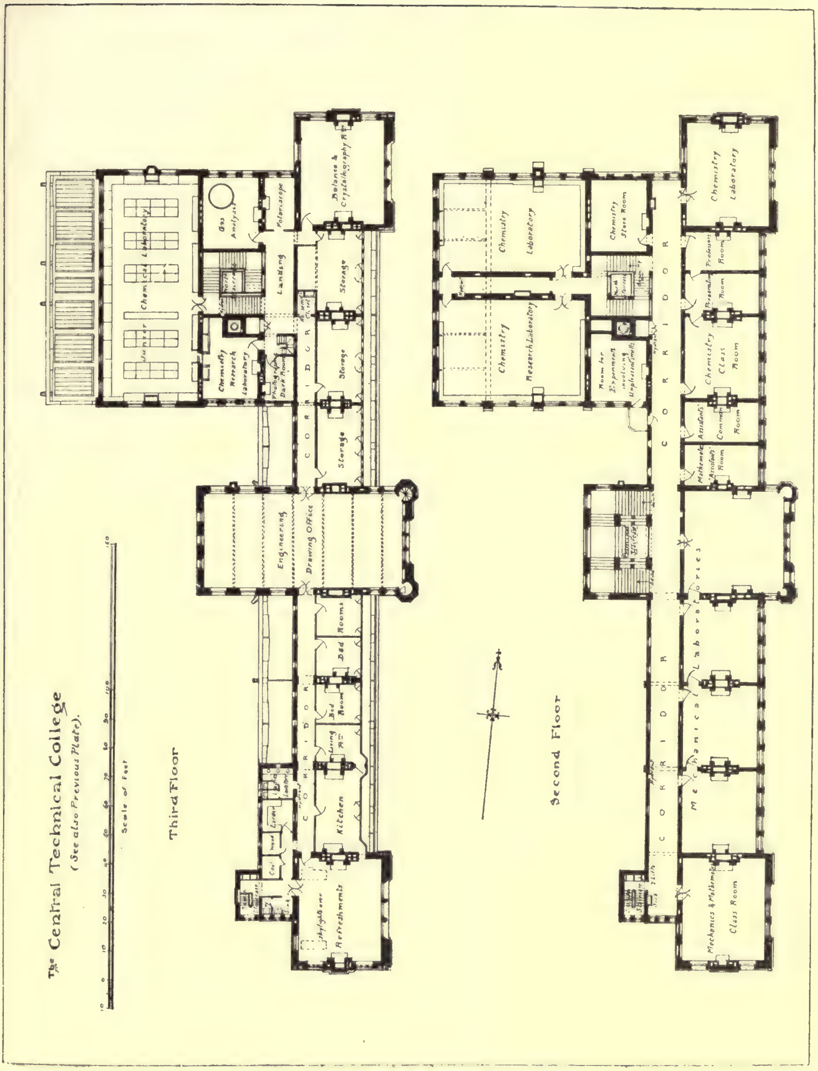

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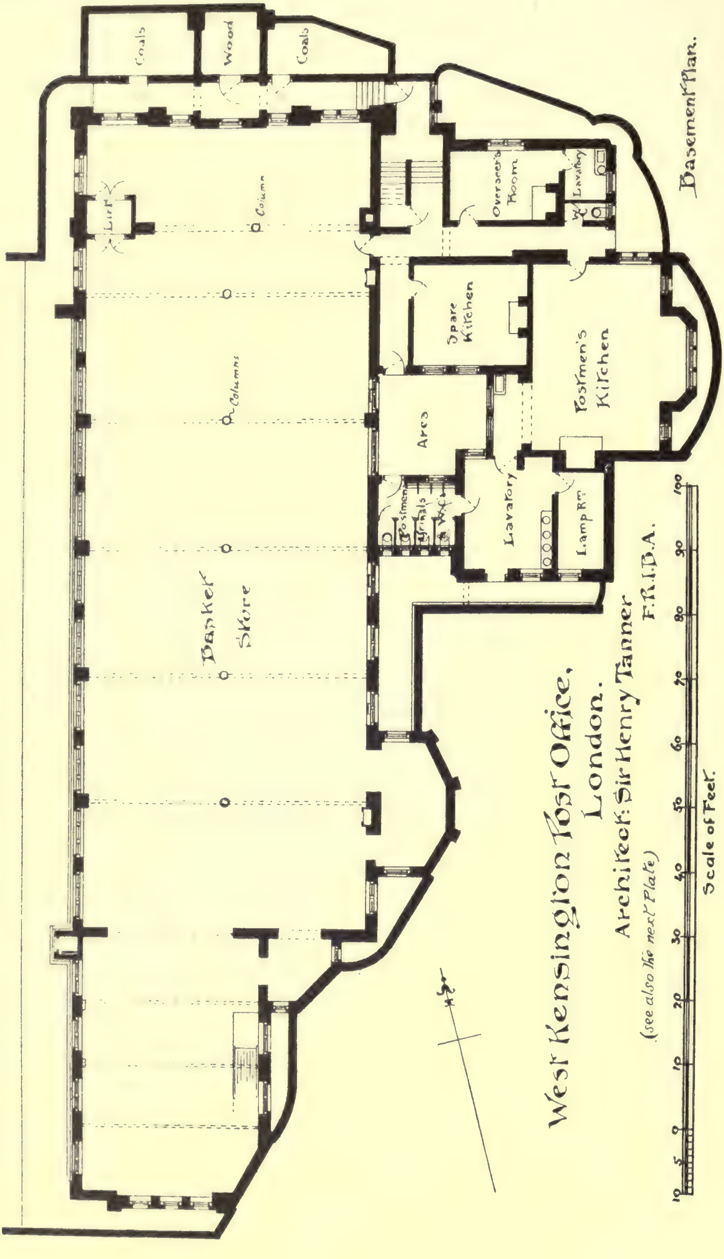
Plate LXII.



West Kensington Post Office, London.

Architect: Sir Henry Tanner F.R.I.B.A.

(see also the next Plate)

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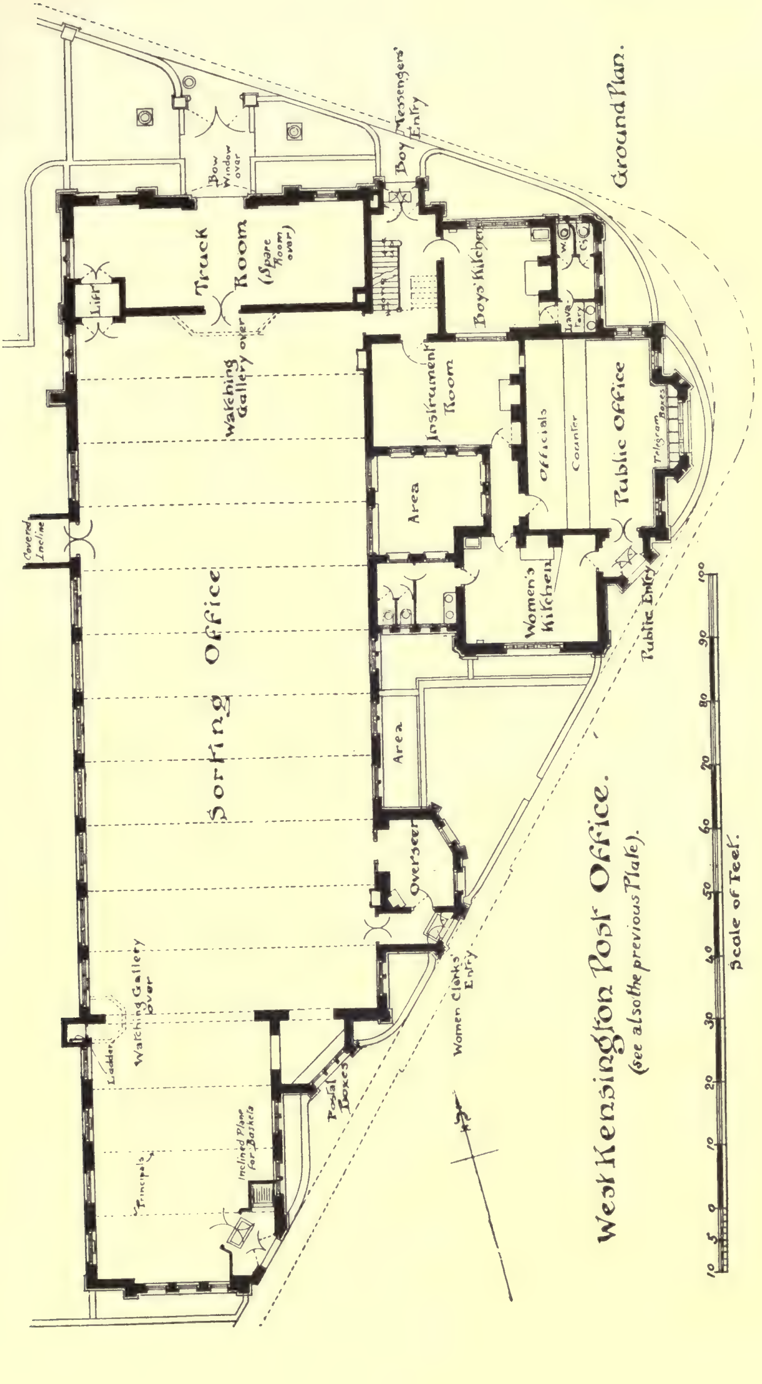
Plate LXIII.



West Kensington Post Office.

(see also the previous Plate).

Ground Plan.

It may be of interest to note the following:—

The medium dimensions for a carpenter's bench are 4 ft. length by 1 ft. 4½ in. width. For a cabinetmaker's bench for a technical school a length of 6 ft. by a width of 2 ft. will suffice. These dimensions are for table-tops, but are exclusive of projections.

In the entertainment halls a width of 1 ft. 10 in. by a depth from front to back of 2 ft. 6 in. per sitting will suffice.

Both good top and side lighting are requisite for obtaining the best results. Lockers and cupboards should be largely provided for the students.

The object in planning a polytechnic should be to obtain room for the maximum number of students that might reasonably be expected to avail themselves of the facilities, provided in the particular district; and wasted space in the building should be deprecated, except it can be utilised as accommodation for additional students. The recreative portion—that is the entertainment hall—requires to be proportionally much larger, to accommodate friends of students.

For plans of the Central Technical College, London, see Plates LX. and LXI., by Mr Alfred Waterhouse, R.A.

Postal and Telegraph Office.—(*a.*) Good accommodation for public; good lighting; separate entrances for the public and officials.

(*b.*) Public and official portions of hall; counter; telegraph boxes; postmaster's room; telegraph and sorting offices; strong-rooms; telegraph and express messengers' room; postmen's room; residential rooms, lavatories, &c.

On Plates LXII. and LXIII. are given plans of an Office designed by Sir Henry Tanner, I.S.O. (H.M. Office of Works).

Poultry House.—See under "Outbuildings."

Refreshment-rooms, Restaurant, Café, &c.—(*a.*) Roominess, ease of supervision and service, minimum of intermediate points of support.

(*b.*) Large dining, &c. space for public, ladies' room, smoking-room, manager's room, grill-room, lavatories, cashier's box or boxes, counter space, service-lift enclosure, kitchen, scullery, stores, &c.

It must be remembered that not all this accommodation will be of necessity required, but in all of these buildings the basis will be the amount of room per individual seated at table. And of equal importance is it to provide table accommodation to suit parties varying in number, the tables consequently being of a size to take two, three, and four people for the most part, though it is well to provide some to accommodate larger parties. The space per customer may advisedly hold a middle place between that provided in a school and the provision in a social dining-room, but the gangway accommodation should be greater. In some of the most modern restaurants there is no niggardliness shown in this or in other respects.

In cafés the space required is considerably less than in those houses that cater for big appetites. Round tables, about 3 ft. 6 in. diameter, or less, are very suitable for cafés and similar places, the absence of sharp angles being highly desirable. Some table tops are oval—say, 3 ft. 3 in. by 1 ft. 7 in.

Of all those establishments that are open to both sexes a smoking-room and a ladies' room should, together with a general room, form integral features. In the first mentioned, the gangways may be modified in width to an extent that would be unjustifiable elsewhere, due to the absence of the flowing and sweeping skirts of the gentle sex ; for, though the attendants are very frequently women, yet, as they wear close-fitting skirts, the latter do not take up much room.

It will be borne in mind, of course, that in thus discussing possible restrictions of width, they are not recommended for comfort, but only mentioned as possibilities.

The minimum width of gangways should be 3 ft., to permit of the passage of two people without discomfort. Though perhaps not intimately concerned with the architect's duties, yet it is as well to note that chairs, having umbrella attachments should be provided. Hat and coat pegs are also necessary, and in this connection it may be noted that, though piers and columns in the body of the hall are apt to be a nuisance, yet their presence very much facilitates the provision of these pegs; and moreover, it may be possible to fit with effect a circular table round a column.

The cashier's box need not be more than 3 ft. wide by 2 ft. 6 in. to 3 ft. deep. The gangway for attendants behind the counter should be about 2 ft. 6 in. minimum, and the counter itself not less than 2 ft. 6 in. wide.

School of Art.—(*a.*) Ample accommodation for the students; aspect; good side-lighting and top-lighting.

(*b.*) Various class-rooms, models' room (in connection with life-class studios), masters' room; W.C.'s, cloaks and lavatories; stores, caretaker's rooms, &c.

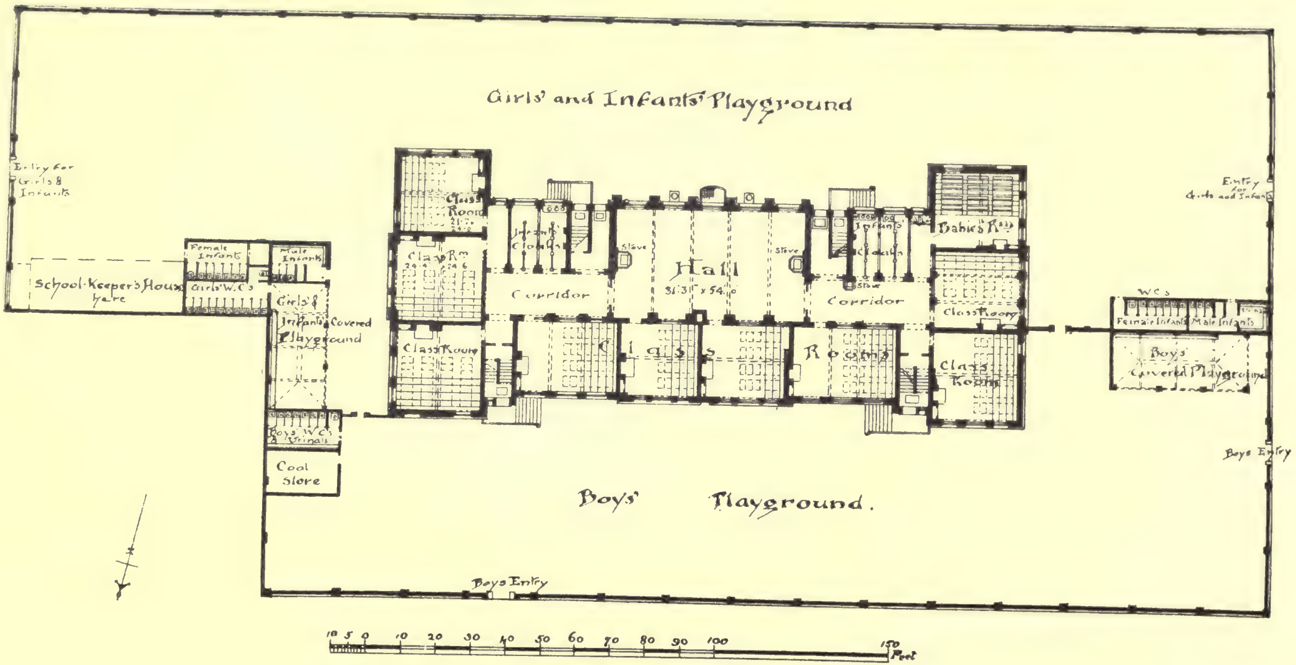
In considering a building of this nature, conditions are presented very different to any possessed by other schools; though the basis is the requisite area per student throughout, yet the calculations for art schools differ totally from those for ordinary schools. Whether the class be one for life-study, model-drawing or sculpture, it is to be noted that a comparatively large unoccupied area is required as contrasted with the school or class room in ordinary circumstances.

It may be granted, to start with, that if the room is suitable for drawing, it will answer for the other arts. It might perhaps be contended that sculptors value a low or "under" light, which for other purposes is, however, undesirable. This is quite correct, but it should be remembered that what may be of paramount importance to people exercising their art professionally may be dispensed with as regards the students in an elementary or chrysalis stage. However, if the sculpture studio is provided in a special room, any doubt as to treatment is solved. Considering, therefore, the individual student's requirements, 9 ft. super. (*i.e.*, 3 ft. depth by 3 ft. width) of space is not excessive, when the requisite easel is allowed for. Another factor in the scheme is, that for correct focussing, the model should be distant from the eye of the student at least twice the length of the longest dimension to be included in the sketch. In a life school, such dimension is likely to average 5 ft. (it is *this* dimension from which measurements would be taken and not the extremities of the object to be copied). The model acting as the focussing point, radial lines of a length of 12 ft. obtain, *i.e.*, twice 5 ft. = 10 ft. + 2 ft. of the 3 ft. depth of space for student (the other 12 in. being for the easel, which obtrudes into the 10 ft. just mentioned). There should be at least a further 2 ft. depth behind the student's pitch. This will produce a diameter of 28 ft. The best treatment in such a studio would be either a semicircular room, or else a rectangle based on a semicircle, in this instance not less than 28 ft. by 14 ft. The next point to establish is the number of students that such a room would accommodate. The radial line to the station point of the student is 10 ft. (that is equivalent to a diameter of 20 ft.), which has a semi-circumference of approximately 31 ft. 6 in. Allowing about 3 ft. width of space per student this room would accommodate eleven, as there would be the width of the side gangway as a necessary addition; were it not for this gangway, only ten students could be accommodated. Customarily a room of this size would be utilised for a greater number at some sacrifice of comfort and convenience. An art-room in a secondary school provides 30 sq. ft. per scholar (see Appendix D, § 6).

School, Elementary.—(*a.*) Efficient light and space; acoustic and optical requirements; separation of boys, girls and infants (but make a note of the provision of "mixed schools"); efficient entrances and staircases.

(*b.*) Class and school rooms; often a central hall;

Plate LXIV.



Plan of a Public Elementary School, Chelsea, London.

Architect—The late T. J. Bailey, F.R.I.B.A.

cloak-rooms, teachers' rooms; open and covered playgrounds, with latrines; heating chamber, &c., stores; residence.

The planning of schools of the public elementary and secondary types being so intimately controlled by the Board of Education, it has been thought well to give as Appendixes to this work the requirements affecting the planning of these buildings (see Appendixes C and D). A plan of an Elementary School in London by Mr T. J. Bailey is given on Plate LXIV.

School, Medical.—(*a.*) Ample accommodation for the students good side-lighting.

(*b.*) Lecture theatres, laboratories, dissecting-rooms, library, common-rooms, professors' rooms, refreshment-room; cloak-rooms, W.C.'s and lavatories; secretary's office, stores, housekeeper's apartments, &c.

A school of this nature is usually attached to each of the large general hospitals, and in addition to the above accommodation it must be borne in mind that a portion of the education is clinical, that is, instruction given in the hospital ward with the patients as illustrative examples; and furthermore, the students are present during operations in the operating theatres, where they are by preference railed off in a gallery.

School, Secondary.—(*a.*) Sanitary requirements; efficient means for tutorial supervision; provision for athletics; privacy of Principal's quarters; good lighting; efficient panic exits; good staircases; aspect.

(*b.*) School and class rooms, dining-hall, dormitories (some divided up into cubicles), lavatories, bath-room, sick-room, music-room, "studies," library and museum desirable, gymnasium, cloak-room, open and covered playgrounds, W.C.'s; house teachers' common-room and bedrooms; head teacher's private apartments; kitchen and offices, laundry block desirable, stores, &c. &c.

One result of placing in the hands of local Authorities the general superintendence and responsibility respecting the schools of the kingdom, is to render useless the studied consideration of areas and accommodation for miscellaneous schools given in previous editions of this work. In Appendix D there will be found a vast deal of useful and reliable information, and to that Appendix reference is now advised. But the following may be preserved from the ruins of the second edition article.

The house teachers' bedrooms should be of a minimum size of 10 ft. by 9 ft., to accommodate a bed (6 ft. by 3 ft.), a small chest of drawers, washstand and two chairs. Each of these bedrooms should have a cupboard. Each room should have a fireplace. An escape-staircase should be provided in a good central position.

The covered playground (or cloister) for use in inclement weather should have a low shelf sufficiently long and broad to accommodate all the play-boxes. A south-east aspect is considered desirable for playgrounds.

The teachers' common-room should be large enough to take a small table, some half-dozen chairs and a small bookcase.

A school, built several years ago and designed by Messrs Whitfield & Thomas, is shown on Plate LXV.

School, Technical.—The particulars and requirements will be a modification of those noted for "Polytechnics."*

Shops.—See under "Business Premises."

Stables.—See under "Outbuildings."

Studio, Painter's.—(*a.*) Aspect, seclusion.

(*b.*) Work-room, model's room, property room, store-room, lavatory and W.C.

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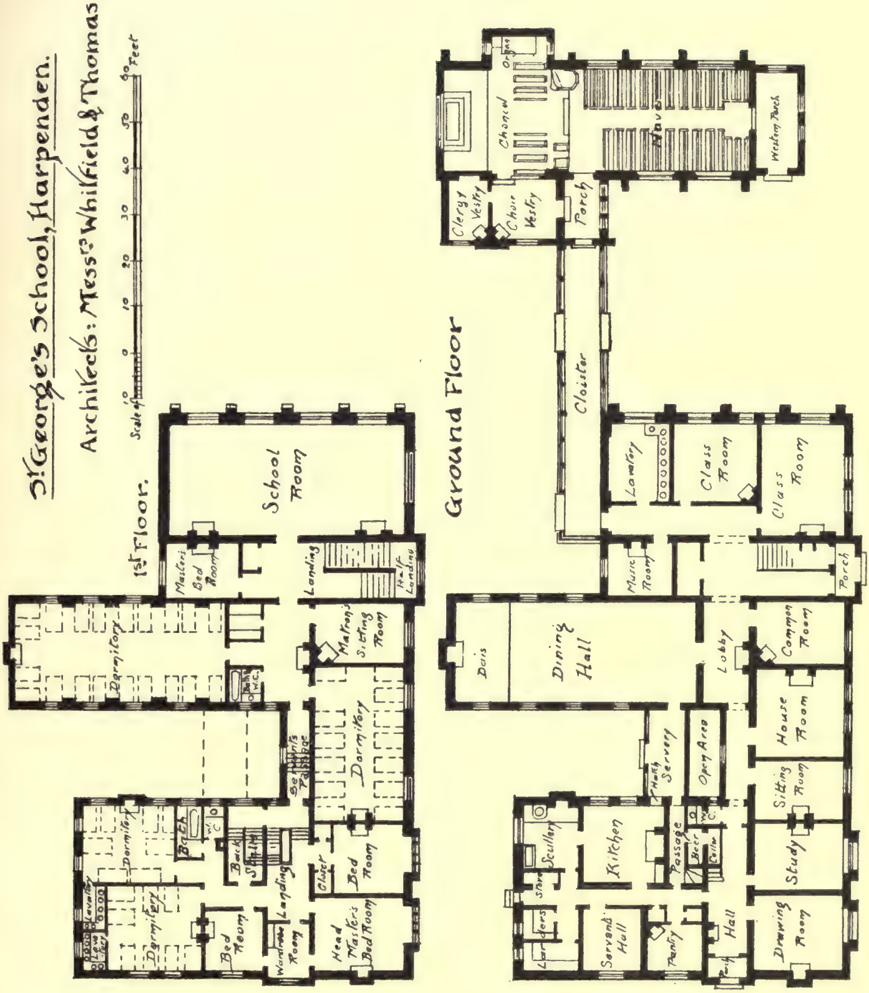
* See also Appendixes C. and D.

80'

Plate LXV.



St George's School, Harpenden.

Architects: Messrs Whitfield & Thomas

The great desideratum in the average studio is the presence of a north light, whether by side or top-lighting or both, with a subsidiary sunny window, that can be used or not at pleasure. Studios are frequently built facing east and west for light.

A model's dressing-room with lavatory basin should be provided; as also an extra room for disused canvases and spare easels, &c. This may be also the room for "properties" not in immediate use.

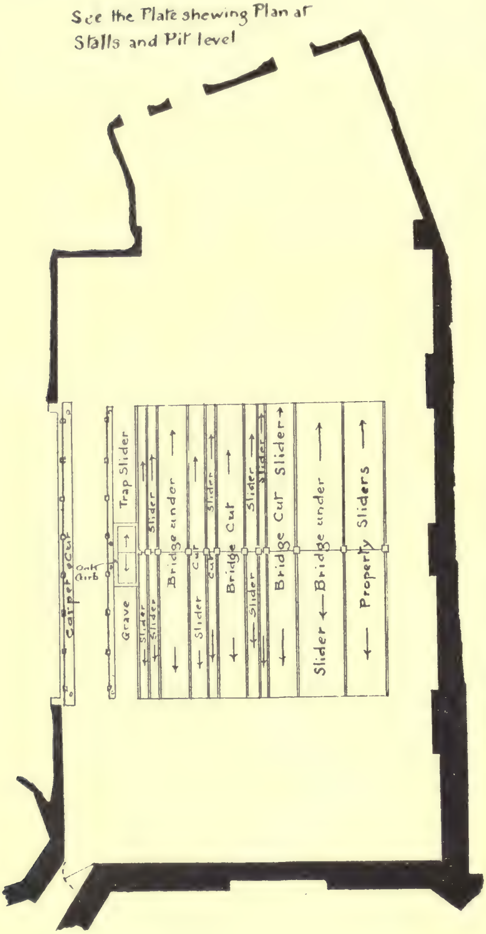
There should be a picture-removing opening in the external wall nearest to the street, for the passage of large canvases in and out, its dimensions being about 14 ft. high by 8 in. wide, and closed in by a hinged shutter.

Technical Institute.—See under "Polytechnics."

Theatre.—(*a.*) Accommodation for actors, musicians and the public; acoustic and optical requirements; efficient and sufficient entrances and exits; special bye-law requirements.

(*b.*) Box office, pay boxes, entrance-hall, crush-room, foyer, refreshment bars; various entrances and exits, cloak and retiring rooms; auditorium (stalls, pit, circles, gallery, amphitheatre), managers' boxes, orchestra, proscenium, stage, back-stage, wings, mezzanine, cellar, flies, flying-bridge, gridiron, scenery entrance and docks, property store, managers' rooms, dressing-rooms, green-rooms, orchestra retiring and waiting room, workshops and stores, toilet dressing-room, waiting-room, employees' rooms, &c.

The minimum width of the proscenium opening is 28 ft. to 30 ft., and the width of the stage should be not less than twice the width of such opening, the height of the latter being not less than its width. The minimum depth of the stage is 30 ft. and it usually slopes upwards from the footlights at a gradient of half an inch to the foot. The stage floor is provided with traps,



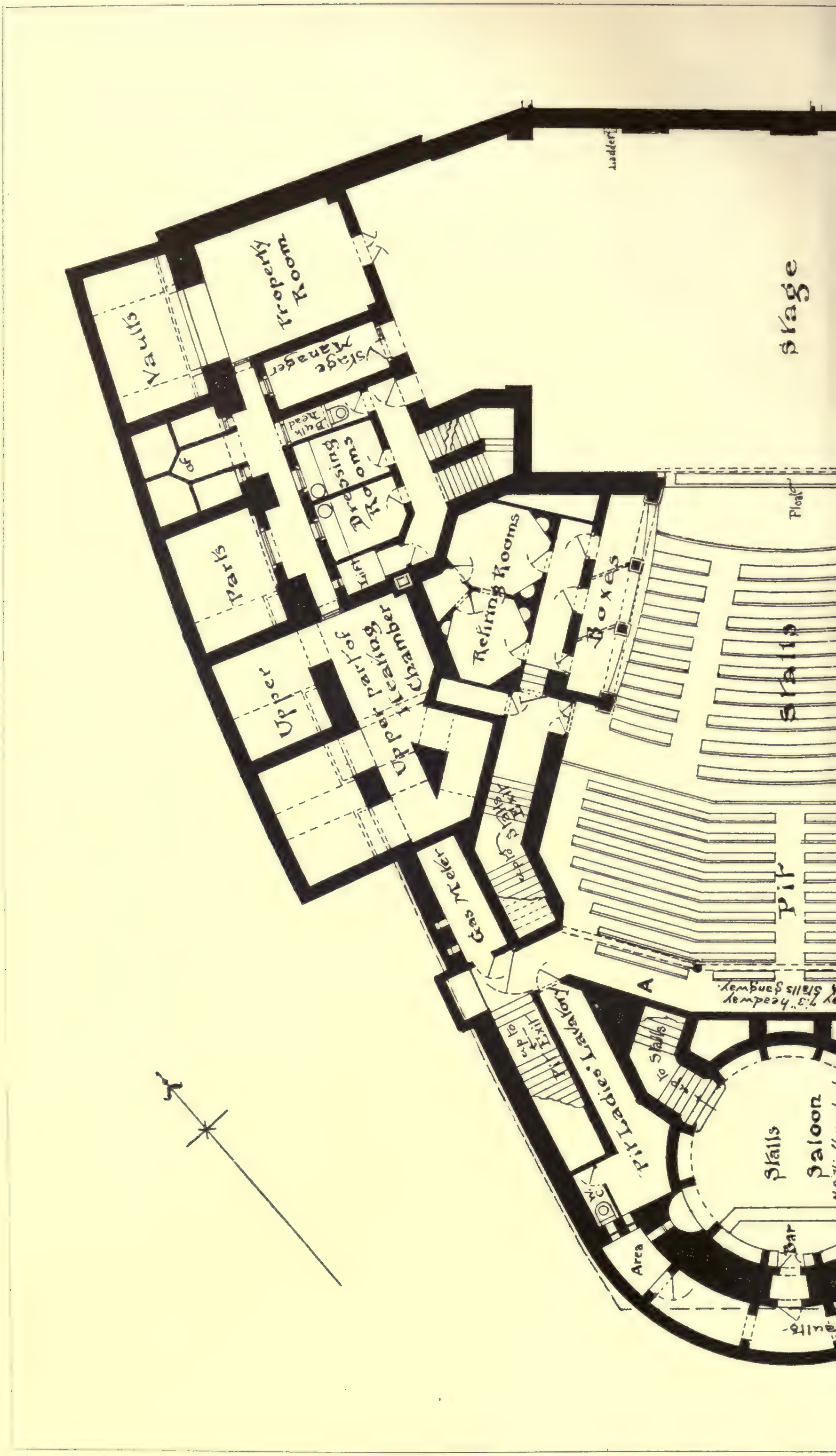
Plan shewing openings in the Stage floor

FIG. 18.—GAIETY THEATRE, LONDON.
[*See Plate LXVI.*]
Reduced Scale – 20 feet to 1 inch.

scene "cuts" and "property" bridges, with "sliders" to cover the openings when not required. The "sliders" work in grooves and are actuated so as to work under the solid portion of the stage flooring, half to either side of the "centre" of the stage. It has been found by experience that the horseshoe-shaped auditorium is best. The "back stage" is useful for obtaining distant scenes.

The basis of accommodation is the seating area per individual:—1 ft. 8 in. by 1 ft. 10 in. suffices for gallery and pit; 1 ft. 10 in. width by 2 ft. 6 in. depth for first and second tiers; whilst stalls should have more generous allowance, about 2 ft. 3 in. by 3 ft.

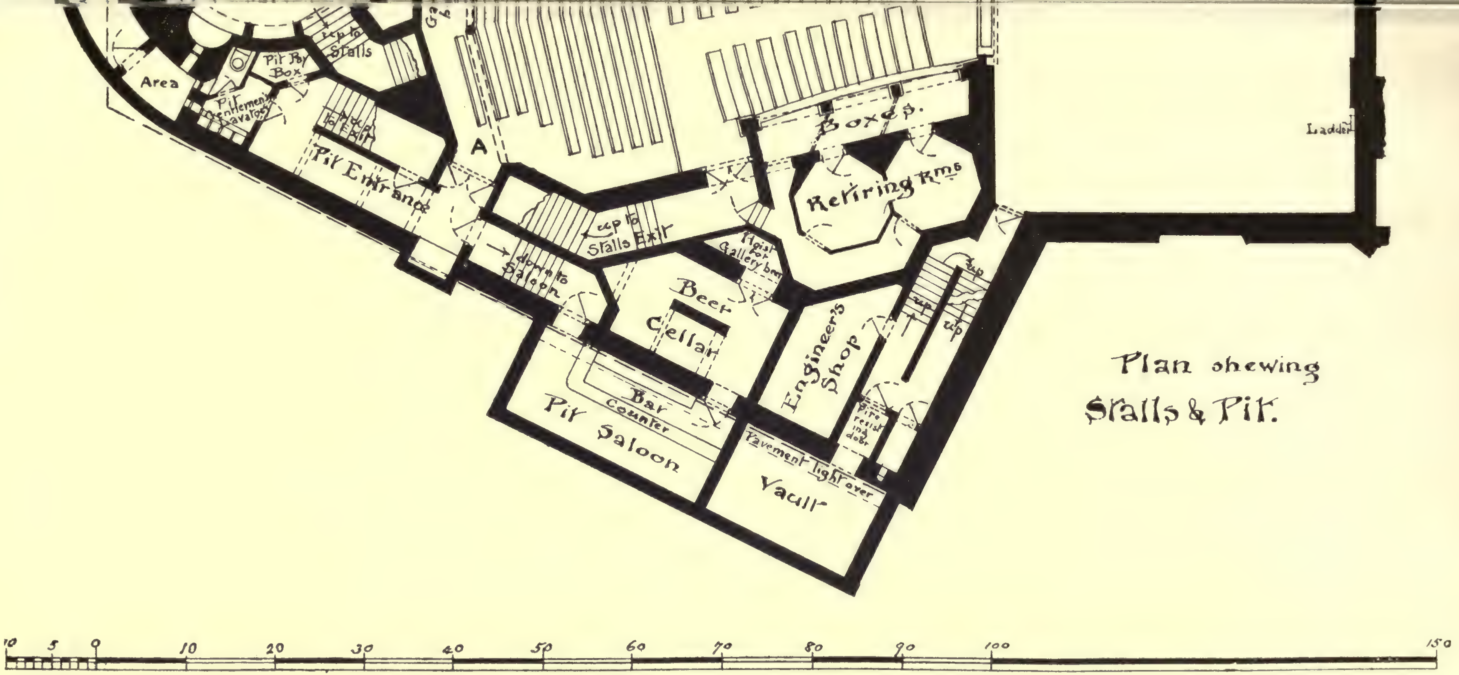
In estimating the accommodation per individual for an approximate total calculation all gangways have to be included, and on this basis not less than 7 ft. super. should be taken as the unit. Thus with an auditorium of say 13,300 ft. super.,



Ladder
Stage
Property Room
Vaults
Stage Manager
Bulk Head
Dressing Rooms
Lift
of
Parts
Retiring Rooms
Boxes
Float
Stalls
Upper
Upper part of Heating Chamber
Gas Meter
up to Stalls Exit
Pit
A
Stalls Gangway.
7.3" headway
up to Exit
Pit Ladies' Lavatory
to Stalls
Stalls Saloon
W.C.
Area
Bar
-line

Plate LXVI.

82



THE NEW GAIETY THEATRE: STRAND, LONDON.

Architects—Ernest Runtz & Ford.

[*See also next Three Plates and Fig.* 18.]

82^3

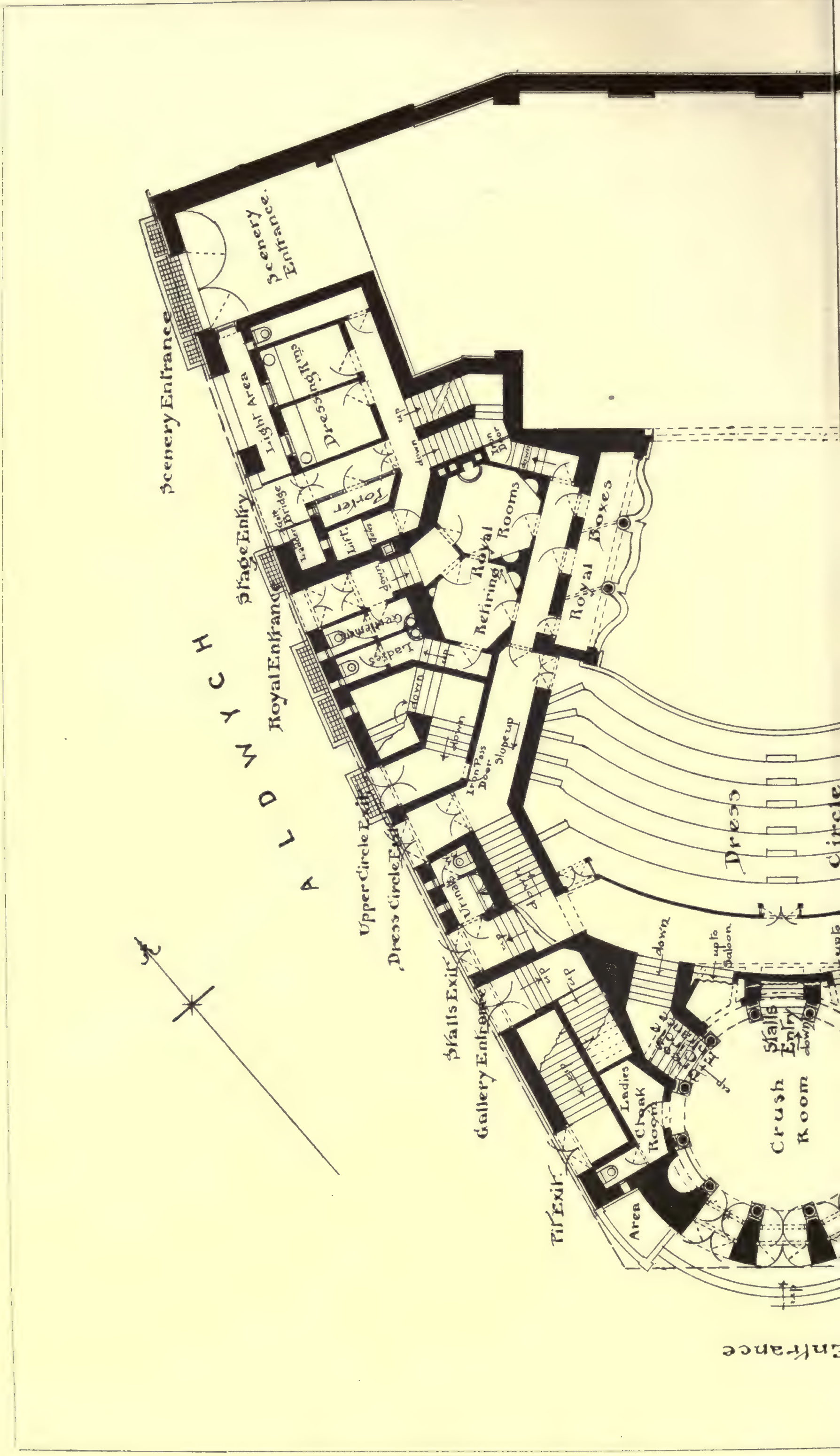
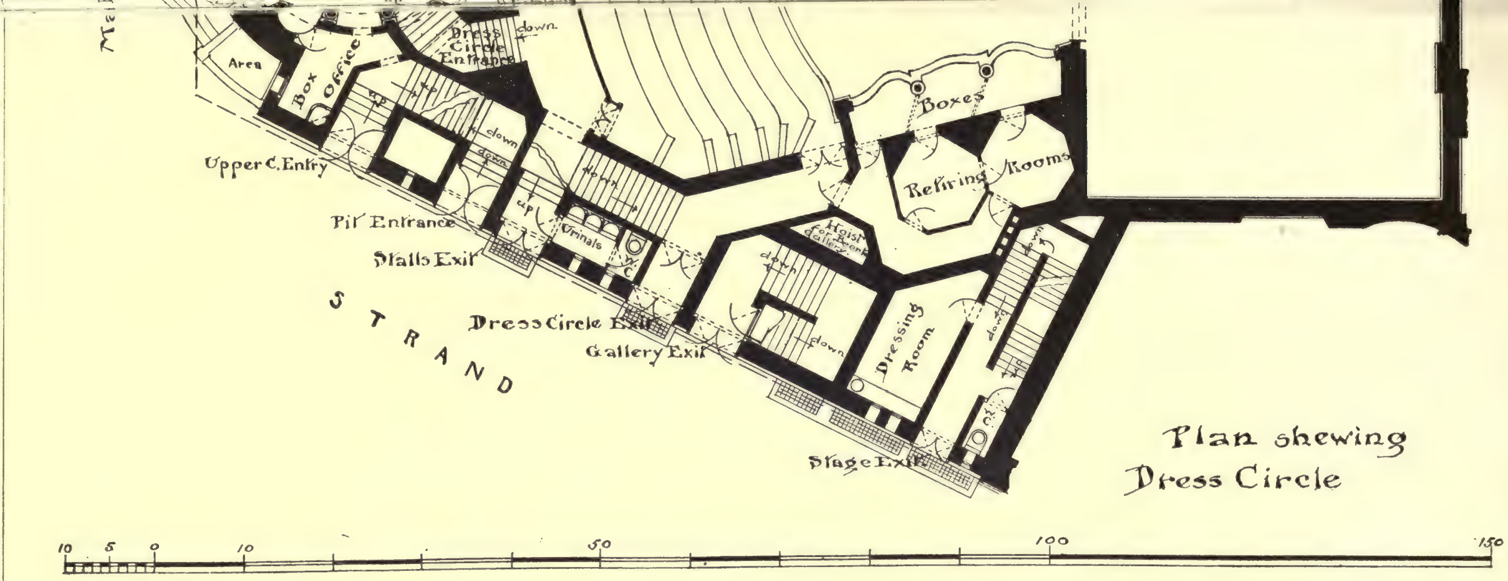

Scenery Entrance
Scenery Entrance.
Light Area
Dressing Rms
up
down
Iron Door
down
Porter
Gent. Bridge
Ladder
Lift
Stage Entry
Royal Entrance
Royal Retiring Rooms
Royal Boxes
Gentlemen
Ladies
down
up
down
Iron Pass Door
Slope up
A L D W Y C H
Upper Circle Exit
Dress Circle Exit
Dress Circle
Urinals
up
down
Stalls Exit
Gallery Entrance
up
up
down
up to Saloon
Stalls Entry
down
Ladies Cloak Room
Crush Room
Pit Exit
Area
Entrance

Plate LXVII.



THE NEW GAIETY THEATRE: STRAND, LONDON.

Architects—Ernest Runtz & Ford.

[*See also previous and the following Two Plates.*]

82^5

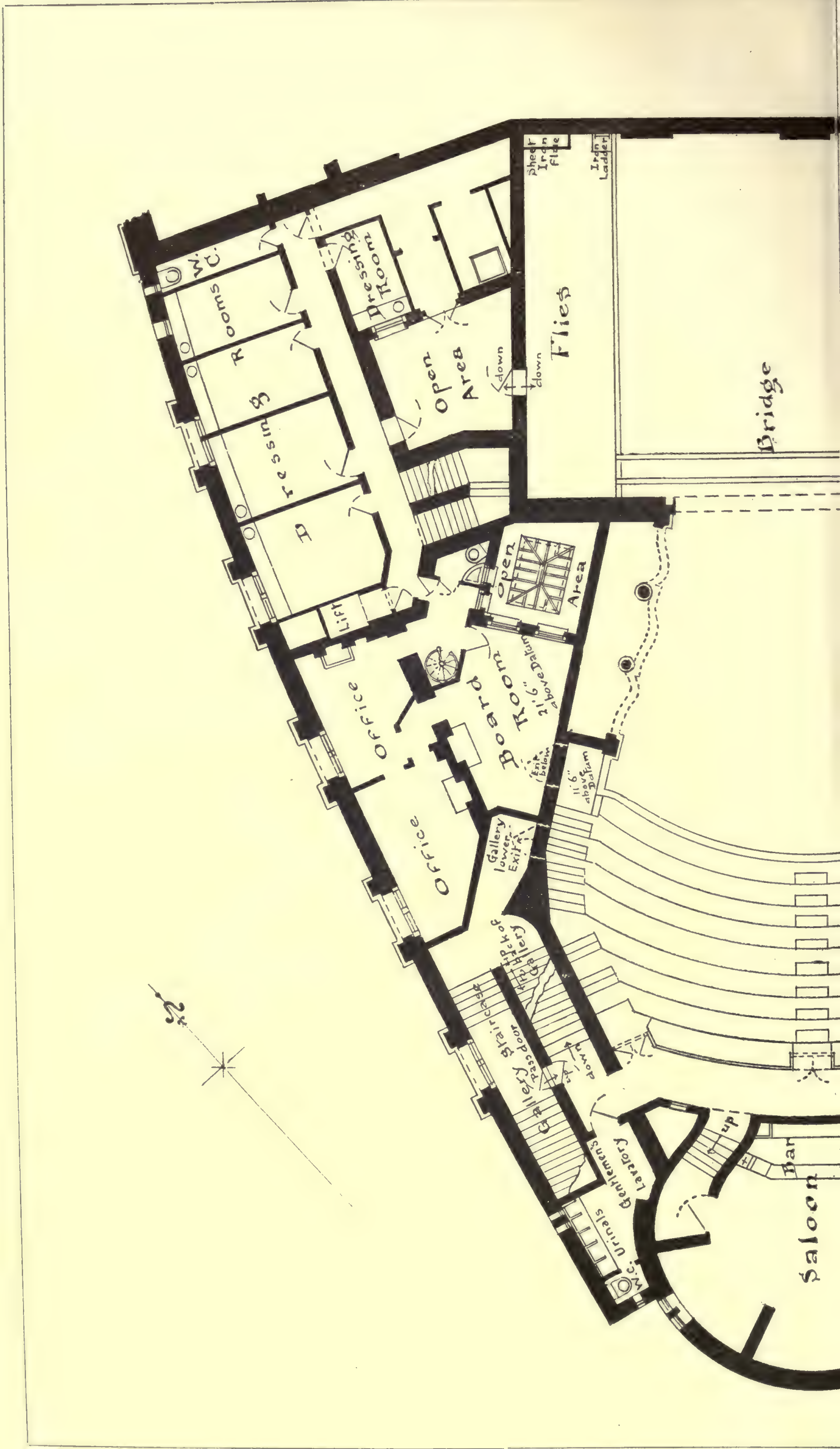
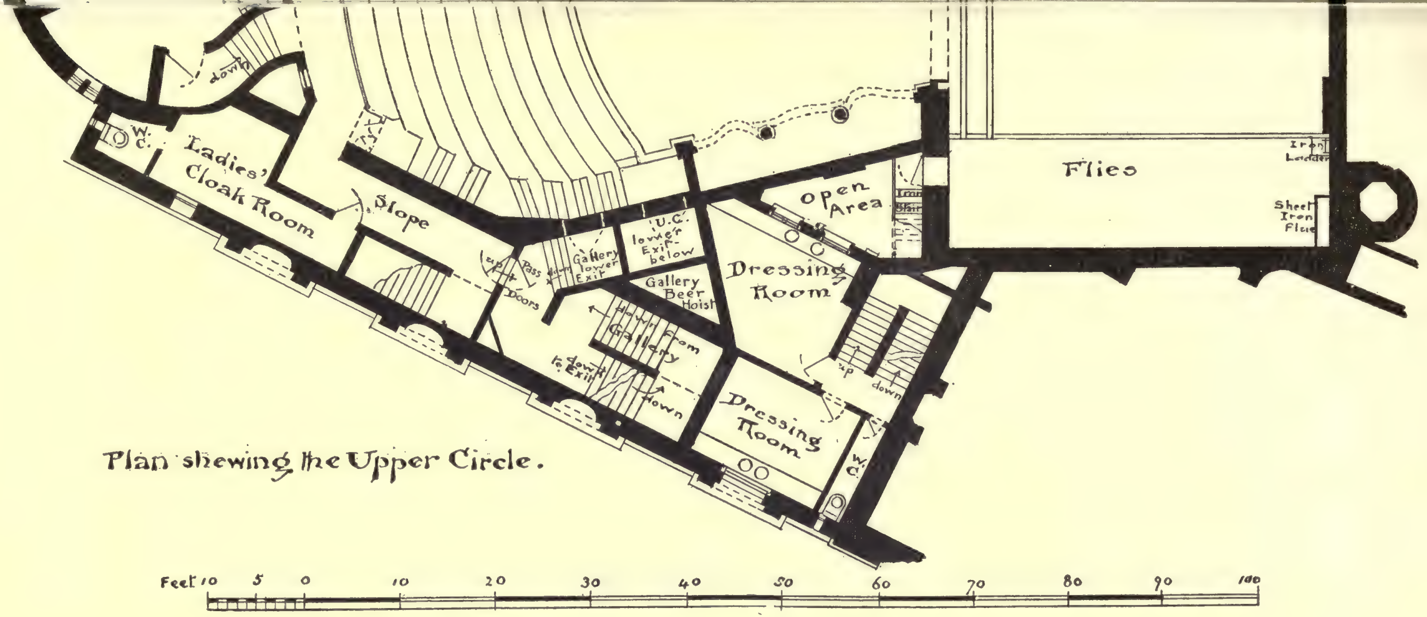

W.C.
Dressing Rooms
Dressing Room
Sheet Iron Flue
Iron Ladder
Flies
Bridge
Open Area
down
down
Open Area
Lift
Office
Board Room
21'6" above Datum
Exit below
11'6" above Datum
Office
Gallery lower Exit
Gallery Staircase
Passdoor
up to back of Gallery
up
down
up
Gentlemen's Lavatory
Urinals
W.C.
Bar
Saloon

Plate LXVIII.



Plan shewing the Upper Circle.

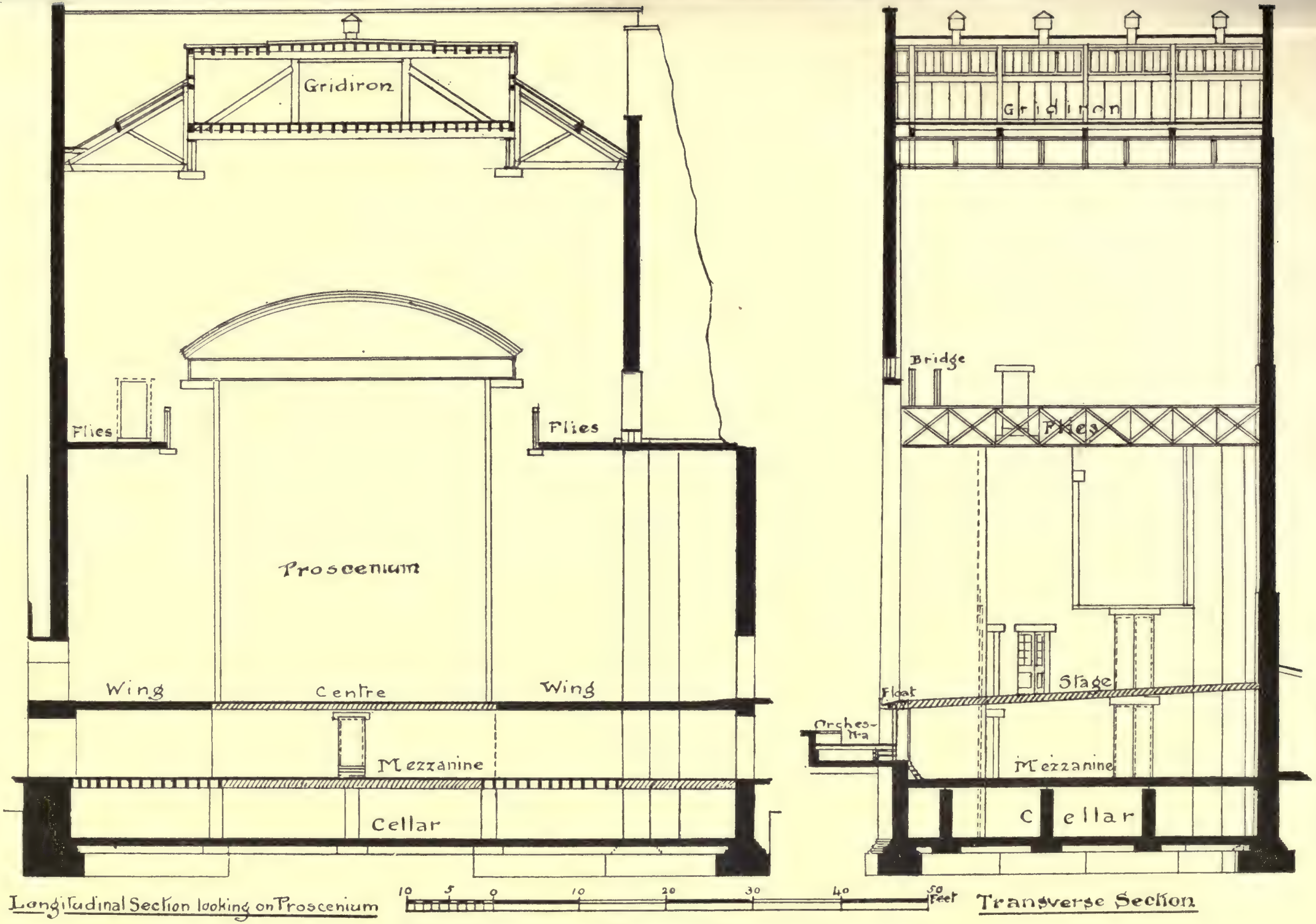
THE NEW GAIETY THEATRE: STRAND, LONDON.

Architects—Ernest Runtz & Ford.

See also Plates LXVI., LXVII., and LXIX.

82 6

Plate LXIX.



Longitudinal Section looking on Proscenium

Transverse Section

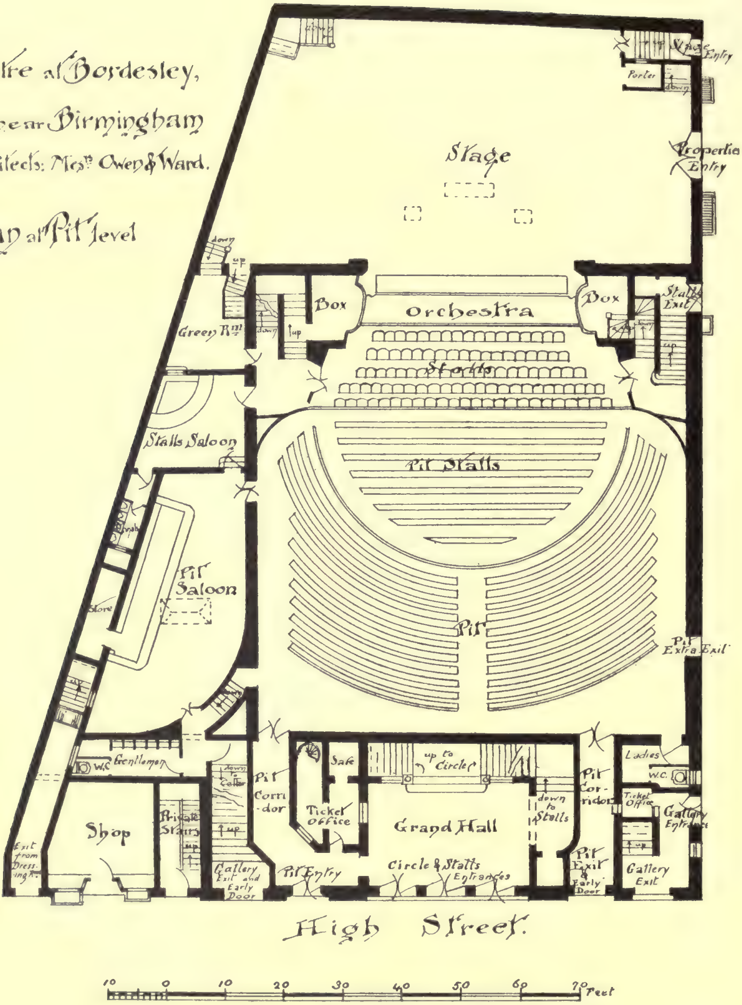
THE NEW GAIETY THEATRE, STRAND, LONDON.

82^{8}

Plate LXX.

Theatre at Bordesley,
near Birmingham
Architects: Messrs Owen & Ward.

Plan at Pit level



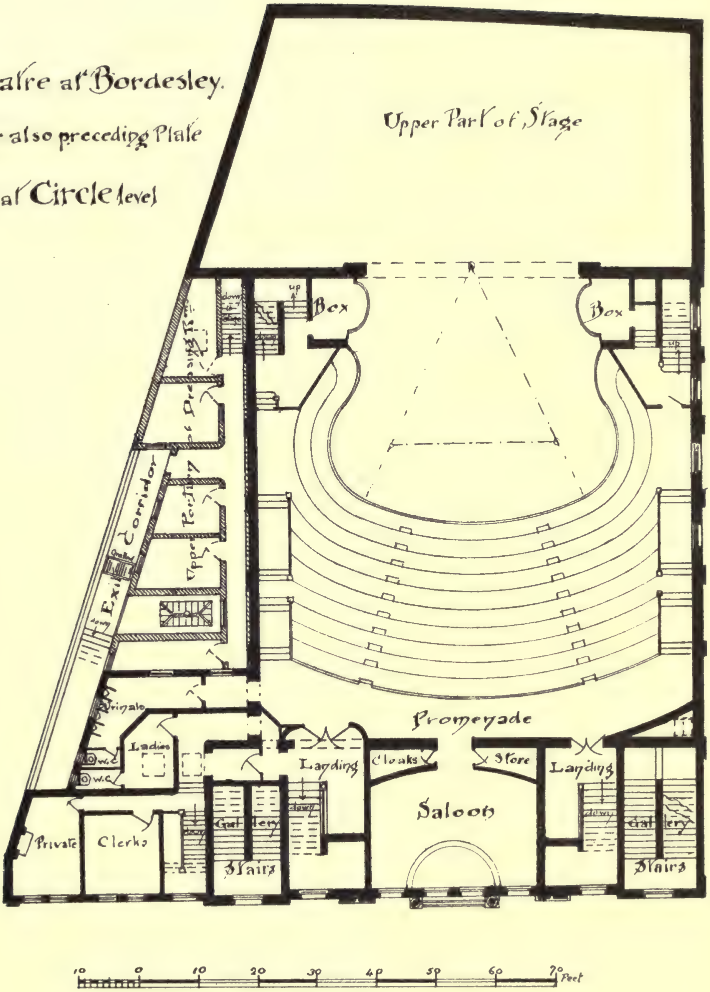
82^9

Plate LXXI.

Theatre at Bordesley.

See also preceding Plate

Plan at Circle level



1,900 spectators could be accommodated on the floor area alone, the tiers being, of course, extras on the above.

Boxes should be capable of holding five or six people comfortably, though the habit of placing them at the extremities of the tiers, instead of centrally, is open to objections.

The entrance-hall and crush-room should be as large as can be conveniently managed; and the entrances to the hall from the street and from the interior approaches must, in London, be in accordance with the County Council Bye-laws. It would be an advantage if similar regulations as to places of public assembly were enforced generally over the country. The scheming of a metropolitan theatre is by no means an easy matter since this Council came into being, and stringent as its regulations are, yet it is a wise severity. The Bye-laws issued by the L.C.C. are given in Appendix B, at the end of this work.

For plans, &c., of a metropolitan theatre by Messrs Runtz & Ford, see Plates LXVI. to LXIX. and Fig. 18; and for a provincial theatre by Messrs Owen & Ward, see Plates LXX. and LXXI.

Cinematograph Theatre.—(*a.*) Special precaution against conflagrations; attention to clauses of Cinematograph Act; ventilation.

(*b.*) Turnstiles and pay-box; public accommodation on the ground floor, sometimes a gallery also; operating room, orchestra (small), picture screen, offices, &c.

Since the second edition of this book was issued, a new variety of theatrical entertainment has come into prominence—the living-picture, biograph or cinematograph show. It is neither to be expected nor desired that it should oust the legitimate drama, but as an auxiliary it has a value of its own. Its requirements are very different; the great world behind the drop-curtain is non-existent here, whereas in the home of Thespis the stage and auditorium occupy nearly equal areas. In this newer class of theatre the consideration of natural lighting is as unnecessary as in the other, whilst the value of acoustics is negligeable, except so far as the notes of the electrical or hand-played piano should not be too insistent.

The operating room is a small compartment, say 10 ft. to 11 ft. square by 7 ft. or more in height, raised well above the ground floor. This compartment must have a film-winding room or lobby in connection with it.

The picture screen, which occupies the position of the drop-curtain of the older theatres, should be large, say 15 ft. square and upwards. In Fig. 19 are shown diagrammatic sketches of the fittings for the cinematograph theatre exhibited on Plates LXXII. and LXXIII., the work of Mr Melville S. Ward. It will be noticed that this building shows much greater accommodation than what is scheduled above, including offices and board-room as well as studio and film-preparing rooms. But it must

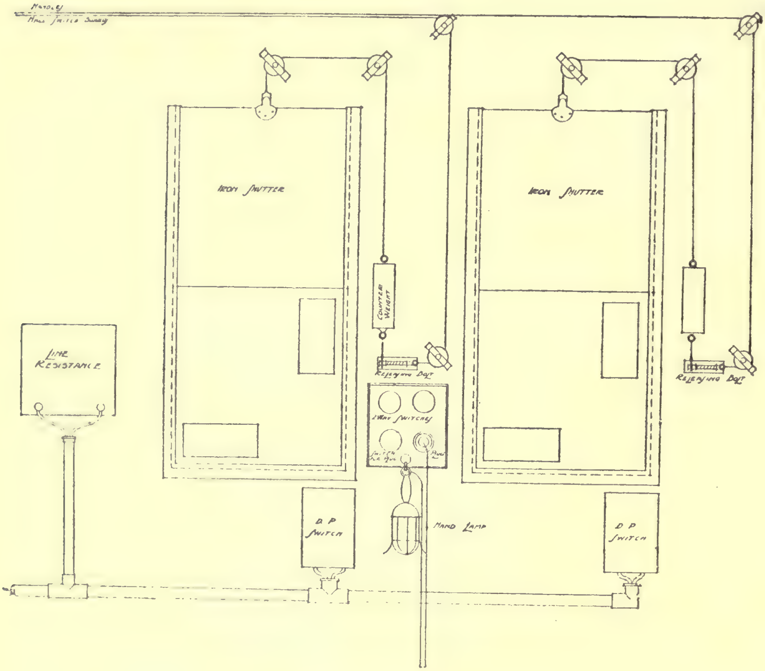
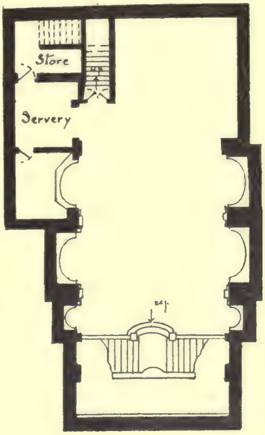
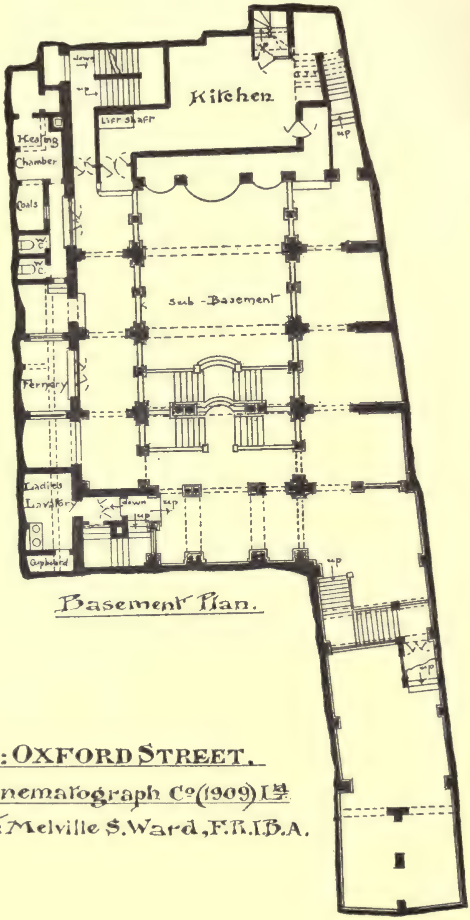


FIG. 19.—CINEMATOGRAPH FITTINGS.

84'



Sub-Basement Plan



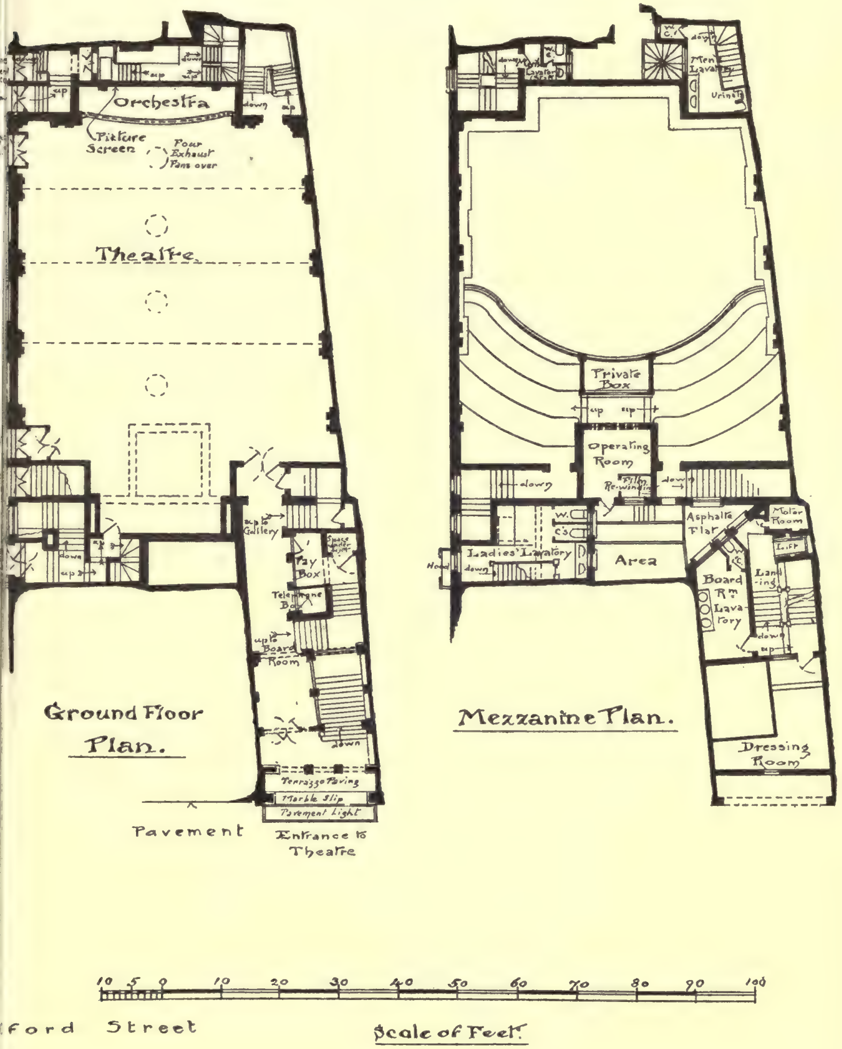
Basement Plan.

CINEMA HOUSE: OXFORD STREET.

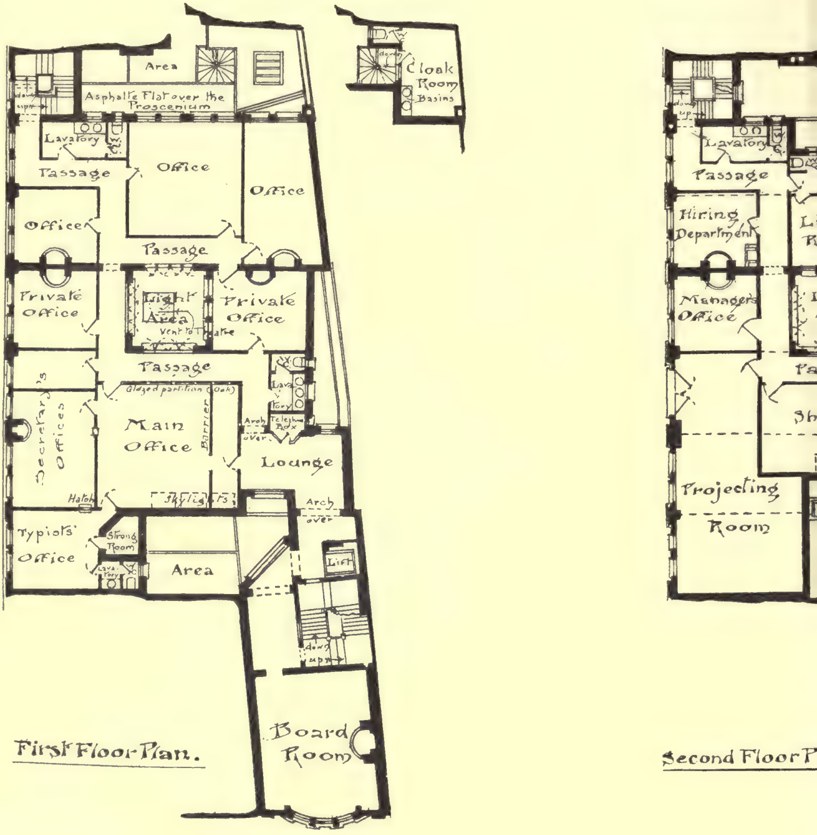
for the London Cinematograph Co (1909) Ld.

Architect: Melville S. Ward, F.R.I.B.A.

Plate LXXII.



[*Between p.* 84 *and Plate LXXIII.*

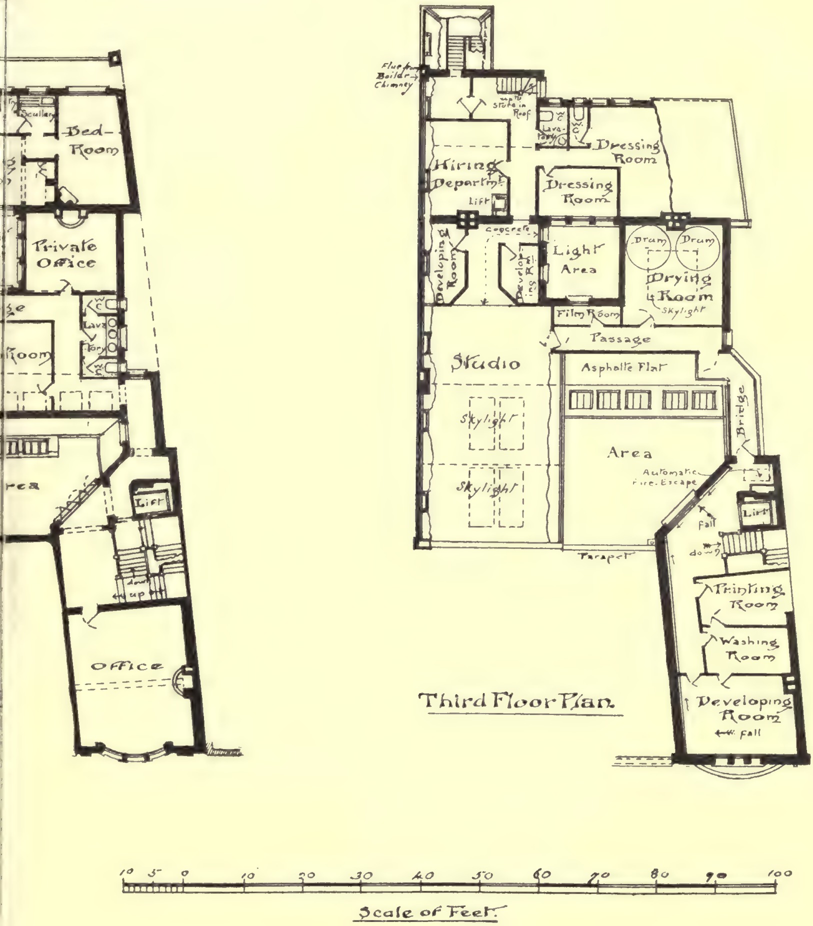


CINEMA HOUSE, LONDON:

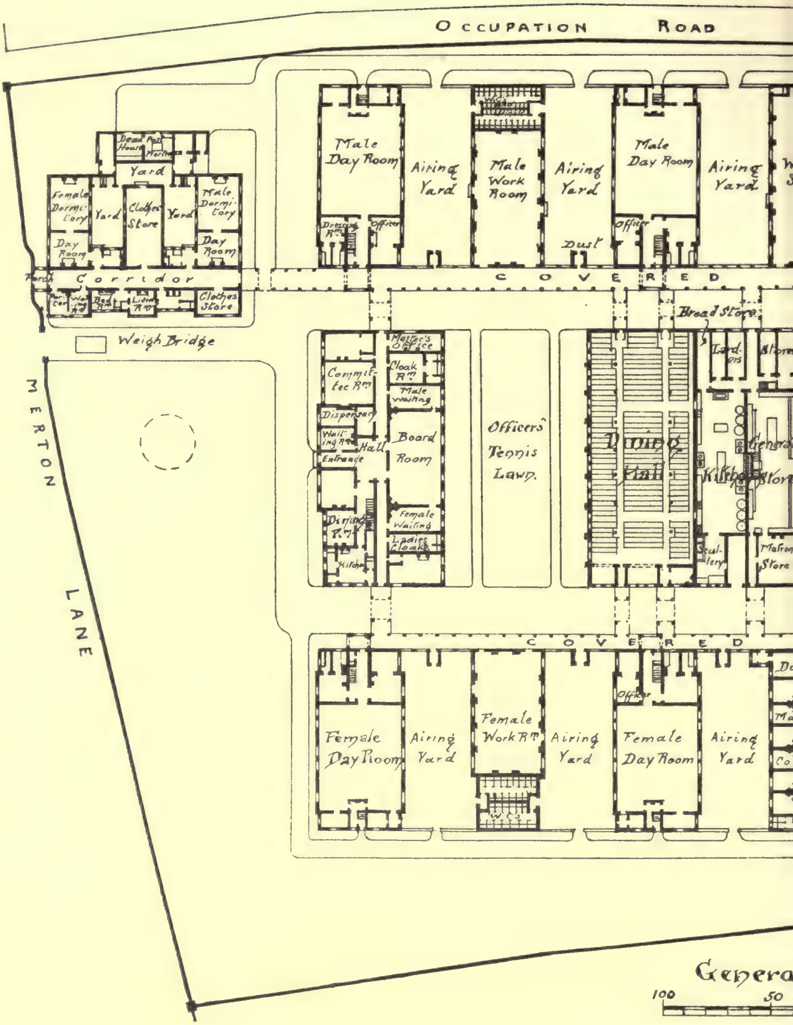
For the London Cinematograph Co (1909) Ltd.

84y

Plate LXXIII.

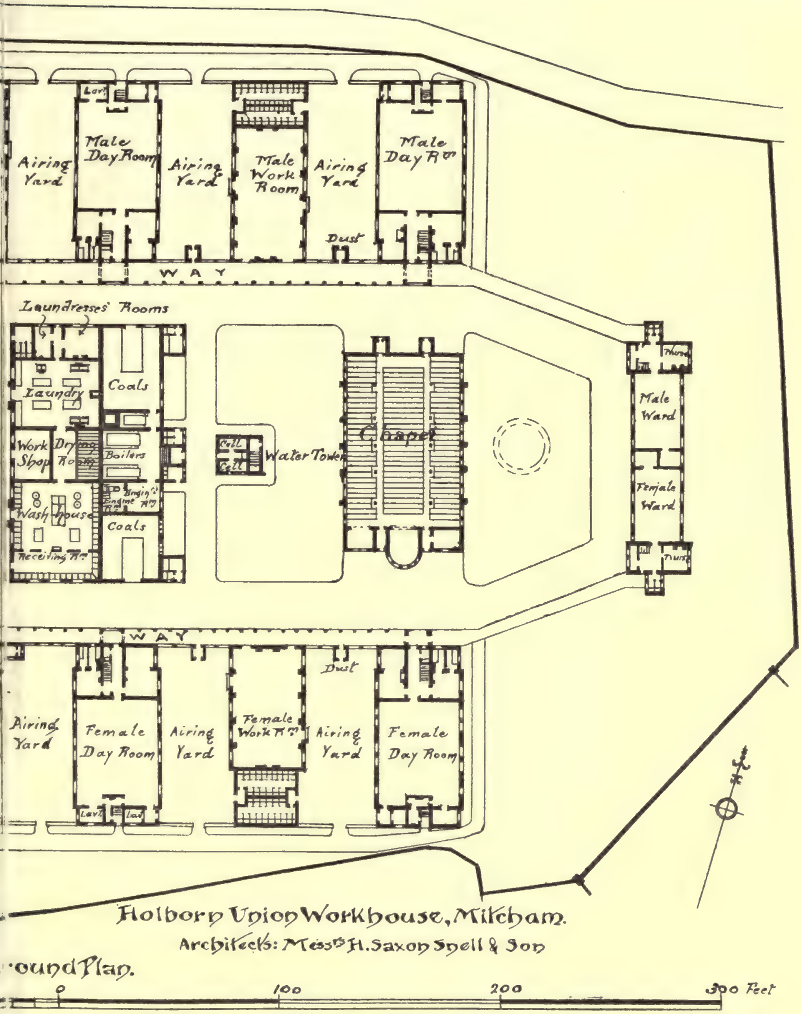


[*Between Plates LXXII. and LXXIV.*


Occupation Road
Merton Lane
Dead House
Workers
Yard
Female Dormitory
Yard
Clothes Store
Yard
Male Dormitory
Day Room
Day Room
Porch
Corridor
Bed Rm
Living Rm
Clothes Store
Weigh Bridge
Male Day Room
Dressing Rm
Officer
Airing Yard
W.C.s
Male Work Room
Airing Yard
Dust
Male Day Room
Officer
Airing Yard
Covered
Bread Store
Larders
Stores
Master's Office
Cloak Rm
Male Waiting
Committee Rm
Dispensary
Waiting Rm
Hall
Entrance
Board Room
Female Waiting
Ladies Cloaks
Dining Rm
Kitchen
Officers' Tennis Lawn
Dining Hall
Kitchen
General Stores
Scullery
Matron's Store
Covered
Officer
Female Day Room
Airing Yard
Female Work Rm
W.C.s
Airing Yard
Female Day Room
Airing Yard
Genera
100
50

84b

Plate LXXIV.

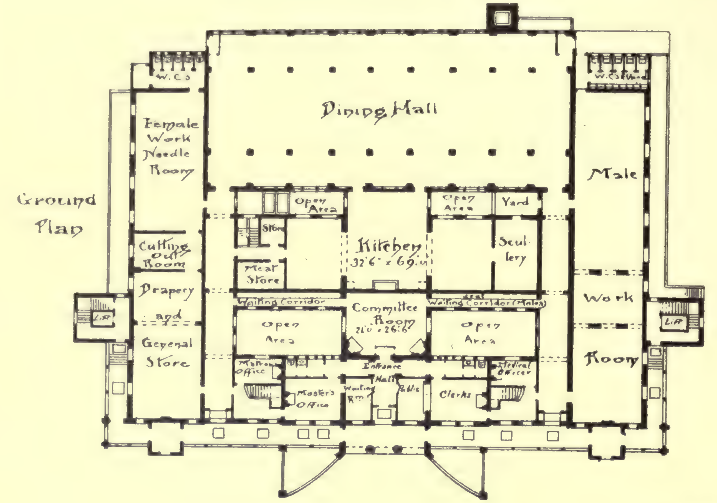


Holborn Union Workhouse, Mitcham.
Architects: Messrs H. Saxon Snell & Son
round Plan.

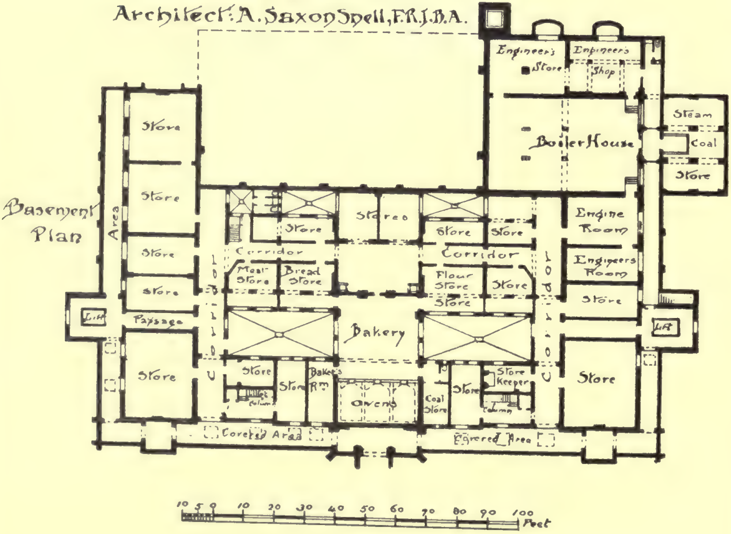
[Between Plates LXXIII. and LXXV.

847

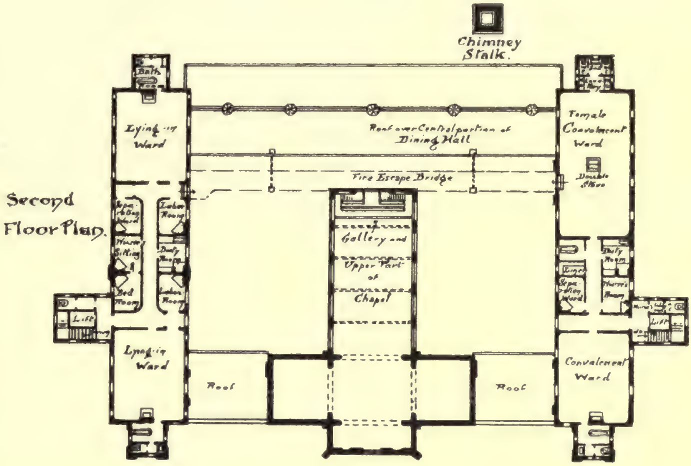
Plate LXXV.



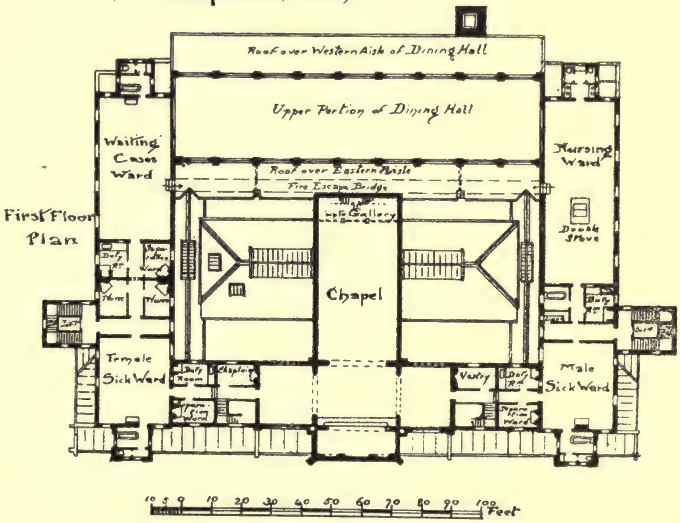
St. Marylebone Workhouse.
London.
Central Block
Architect: A. Saxon Snell, F.R.I.B.A.



84 8



St. Marylebone Workhouse.
London
(See also previous Plate).



be borne in mind that most of the theatres would merely be supplied with the films prepared elsewhere.

Town Hall.—See "Municipal Buildings."

Village Club and Hall.—See earlier, under "Club-house."

Warehouse.—(*a.*) Unencumbered floor space; avoidance of open staircase-wells.

(*b.*) Various floors for warehousing; offices, delivery and packing rooms, lavatory and W.C.'s, &c.

Workhouse.—(*a.*) Central administration, grouping, lighting, economical planning, classification of inmates.

(*b.*) Receiving and discharging wards, common dining-hall, day-rooms, workshops, airing-yards, dormitories, washing-rooms, chapel, infirmary, dispensary, laundry, stores, lying-in wards, married couples' quarters, &c.; imbecile and casual wards, superintendent's and matron's rooms, committee-room, doctor's room, kitchen, &c.; out-relief department (containing waiting and consultation rooms, &c.); panic staircases.

A plan showing the general disposition of a workhouse, by Messrs H. Saxon Snell & Son, is given on Plate LXXIV., and on Plates LXXV. and LXXVI. are given plans of the central block of St Marylebone Workhouse, London, by Mr A. Saxon Snell.

In the combined meal-room and dormitory 54 ft. super. space per inmate is allowed, and the washing accommodation should consist of a range of lavatory basins in an adjoining compartment. There should also be foot-washing troughs. Where there is a separate dining-hall, the dormitory may provide less space, say 36 ft. super. per inmate.

Wards may be 10 ft. in height and upward and a minimum width of 18 ft. Allow 50 ft. super. per woman and child in the dormitory. In the day-room allow 15 ft. super. per occupant.

It is worthy of consideration, whether the dormitories should not be divided into cubicles with separate washing-basins, each cubicle being thus self-contained. However, if this be deemed too great a reform generally, it should certainly be a provision for the deserving inmates of the poorhouse. The merits of classification of inmates are now recognised by the Local Government Board, and many desirable and interesting modifications in planning will thus be effected. Cottage homes and boarding-out for pauper children will have the same effect. The Local Government Board requires in cottage homes 300 cub. ft. bedroom allowance per child; in small "block" homes (for about fifty children) the State requirement in the dormitory is 360 cub. ft. per child.

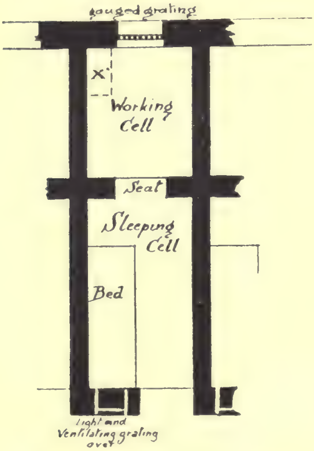


FIG. 20.

The ethics of the subject are beyond the boundaries of the architect's consideration professionally, and therefore (beyond remarking that every discouragement should be placed in the way of people, to prevent them from becoming paupers, and that the deserving inmates, who have become paupers through misfortune, should receive beneficent and home-like treatment) the strict record of this book will be maintained.

Casual Wards are provided for the reception of tramps, who want a night's board and lodging, in return for which, a modicum of work is required. This sometimes takes the form of oakum-picking, which can be effected in the sleeping-cell; women are often given charing work as their portion instead of oakum-picking. Frequently, however, the men are required to break stone, in which case separate cells are necessary. The sleeping-cell may be about 8 ft. by 4 ft. 6 in., giving entrance to the working-cell, about 5 ft. 6 in. by 4 ft. 6 in.; the latter has a gauged grating for the passage of the stone when broken.

The sketch appended is the form of cells, adopted by Messrs Snell in one of the London workhouses. The level of the working-cell is lower than that of the sleeping-cell, sufficient to form a seat at entrance into the former. It is advisable to have the floor lower, but a better position for the seat would be at X near the gauge. Bath-rooms, attendants' and waiting rooms are also required.

Modern ideas tend to eliminate so-called degrading labour from workhouses, and stone-breaking is frequently included in this category. When these ideas prevail, the planning of such buildings will be to an extent modified.

In workhouse infirmaries throughout the kingdom the number of patients is seldom allowed to exceed 600; the cubical space required per patient varies from 600 ft. for ordinary infirmary cases to 960 ft. for offensive cases; in the metropolis the respective figures are 850 cub. ft. to 1,200 cub. ft.

On the female side special wards in the infirmary are required for lying-in cases and they must be planned with as much care as the infectious wards of hospitals, but they should accommodate a smaller maximum number of patients than the hospital wards customarily provide for.

It may be noted, that the provision and requirements of workhouses and their infirmaries in the United Kingdom are subject to the regulations of the Local Government Board.

Finally, the reception of imbeciles in workhouses is under debate, as it is by many considered to be injudicious; at present, however, the law demands their reception; but this and other matters, such as classification of inmates, are receiving the sympathetic consideration of the Local Government Board. Some Poor-Law authorities build special Asylums for boarding such of the weak-minded, as come under their control.

Workmen's Clubs.—See under "Club-house."

CHAPTER IV.

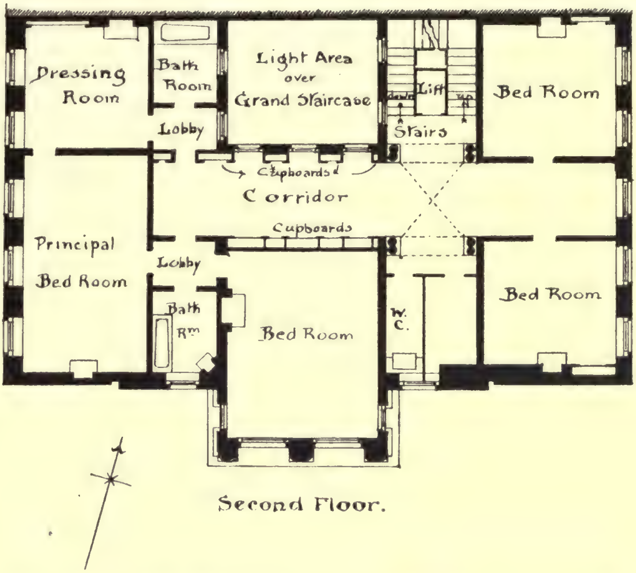
DOMESTIC PLANNING.

IT has been thought desirable to remove from an earlier chapter the comparatively lengthy reference to houses, in order to incorporate it with additional matter in a special chapter.

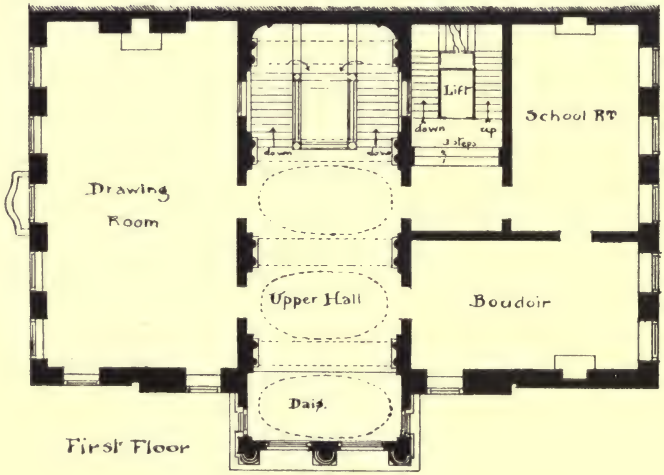
As this book is intended to be a guide to modern requirements, the historical aspect is not of great importance, not even in the recognition of the fact that the necessities of past years have mothered the invention or adaptation of certain methods for the satisfaction of their claims. The historical development of the house was admirably dealt with in literature of the nineteenth century, and therefore does not demand re-writing; for whilst such accounts are possibly open to revision of localised errors, there would be no emendation of the broad utterances.

This is, however, not the case when the scheming of a modern house is under consideration; the change in social conditions and ideas (largely the outcome of the increasing facilities of locomotion and of the democratic tendencies of to-day) has resulted in a readjustment of the architect's lines of procedure in domestic architecture. The change is more widespread than might be apparent at first and it has effected alterations in domestic treatment from the workman's cottage to the country mansion. Sociology, hygiene, travel, science—all have been factors in the drastic modifications, to which the present-day public is becoming inured.

Convulsions in the progress of architectural development were known in the centuries antecedent to the Victorian era; but the application of steam power to the purposes of locomotion gave an impetus to travel, which in turn, by reason of the fostering influence that it exercised over intellectual growth, Plate LXXVII.



Second Floor.



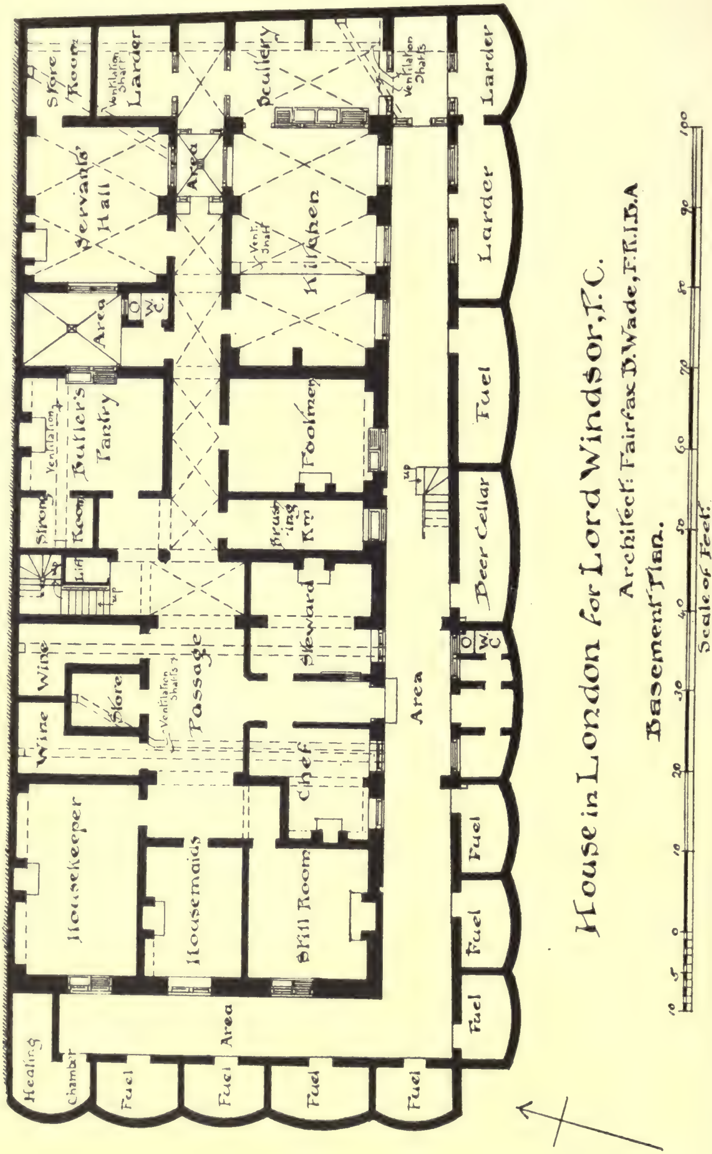
First Floor

House in London for Lord Windsor.

Architect: F. B. Wade, F. R. I. B. A.

Scale of Feet.

Plate LXXVIII.



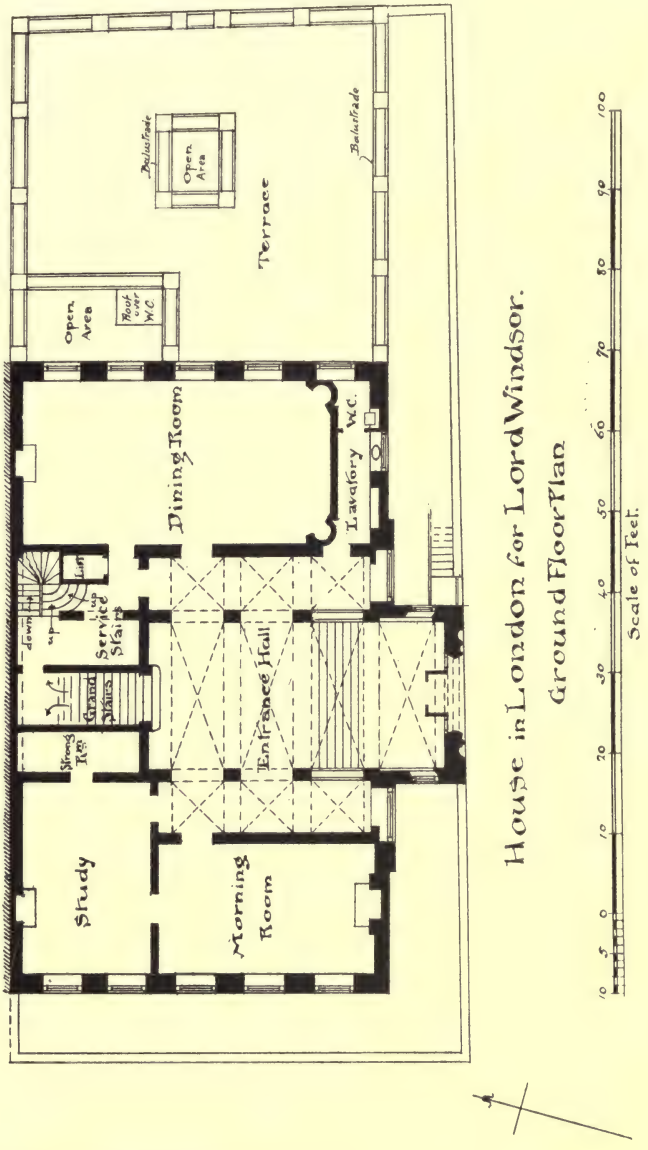
House in London for Lord Windsor, P.C.

Architect: Fairfax B. Wade, F.R.I.B.A

Basement Plan.

Scale of Feet.

Plate LXXIX.



House in London for Lord Windsor.

Ground Floor Plan

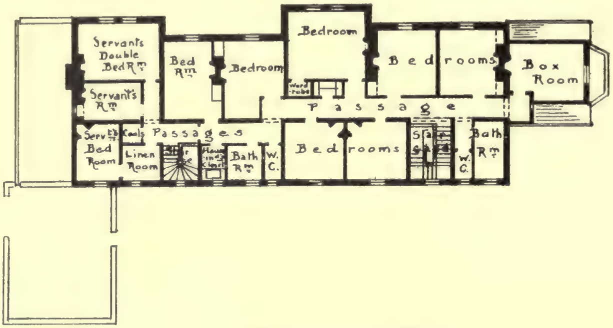
88^4

Plate LXXX.

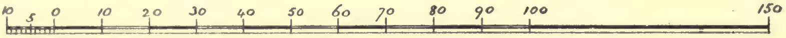
LAIRDMANNOCH: KIRKCUDBRIGHTSHIRE, N.B.

Shooting Box built for Walter Neilson, Esq^re

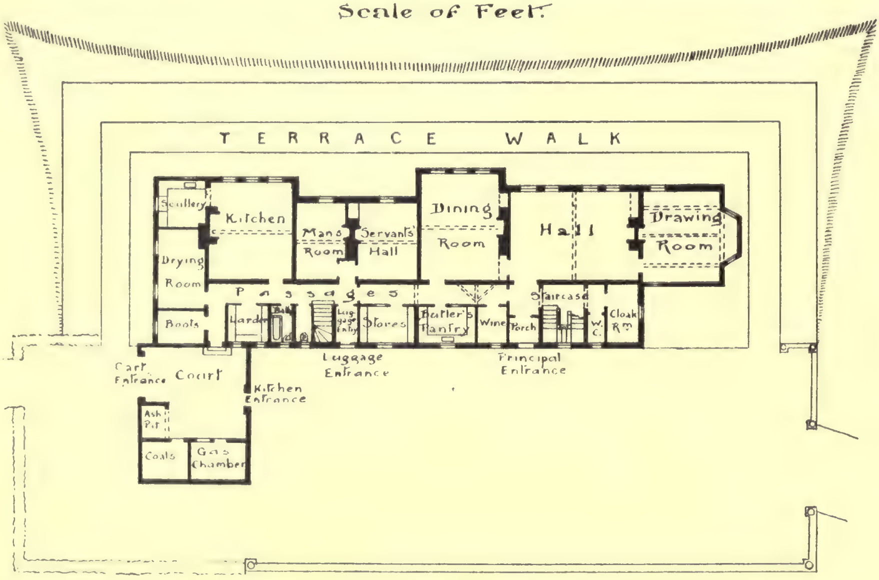
James K. Hunter, F.R.I.B.A., Architect.



Chamber Plan.



Scale of Feet.



Ground Plan.

led up to the various mechanical and other discoveries, which are directly responsible for the mode of life of to-day.

There cannot be any rigid and domineering type for domestic planning, for in every case individual requirements, even idiosyncracies, will suggest modifications. Irrespective of this, the scheme of a house will differ according to its location in town (see Plates LXXVII. to LXXIX. and LXXXIII. and Fig. 23), in the suburbs (see Plate LXXXII.), in the country (see Plates LXXXVII. to XC. and Fig. 22), or in the Colonies (Plate LXXXIV.). It will differ also according to the amount of accommodation required, and by reason, too, of its alternative treatment as detached (Fig. 23), semi-attached (LXXXIII.) or "terrace" (LXXXVI.) in relation to other buildings. Shooting-boxes (LXXX.) and "bungalows" (LXXXI.) have also special treatment. Differences too arise as the result of the scale and the rental of various houses, and whether restrictions occur, as is often the case in schemes of alterations (see Plate LXXXV.).

Bearing all these points in mind and also the necessity for keeping this book within bounds, the endeavour herein will be to suggest by example and illustration the solution of typical problems, so far as type may be considered.

As regards the disposition of a house on a choice of sites, it is desirable to avoid exposure to the quarter-compass between north-west and north-east. The slope of a moderately inclined hill is advantageous, sufficiently removed from the summit to secure shelter from the colder aspects, but at the same time not situated at or near the base of the hill.

Before going further, it will be desirable to epitomise, as with other buildings (considered in Chapter III.), the essential features and accommodation.

(*a.*) Aspect, prospect, privacy, economy of service, furniture requirements, sanitation.

(*b.*) Reception and business rooms, bed and dressing rooms, bath-rooms, W.C.'s, linen and housekeeper's rooms, kitchen and offices, larders, stores and cellars, dairy, &c. &c.

In planning houses, the fundamental principles always hold good to a greater or less extent; but for the present purpose, it will be well to take some specific examples—say a seven-roomed, a twelve-roomed and a sixteen-roomed house. The first would comprise drawing, dining and morning rooms, four bedrooms, bath-room and two W.C.'s, and kitchen offices. The bath-room, &c. and kitchen, scullery, &c. are (or should be) necessities, and are not included herein, when reckoning the number of rooms.

Though this book does not profess to deal with the financial aspect of building, it may still be noted that, generally considered, basement excavation is more expensive than surface excavation, which is again more expensive than adding another storey to a building. The inference is obvious; when wishful to deal as economically as possible with a site, it is preferable to build outwards rather than downwards, and upwards rather than outwards.

Reasonable treatment for a seven-roomed house would give such a disposition as this:—

Semi-basement. — Breakfast-room, kitchen, scullery, larder, servants' W.C., and stores.

Principal floor.—Drawing and dining rooms.

First floor.—Three bedrooms, bath-room and W.C.

Attic.—Bedroom.

Or, as alternative, it might be thus:—

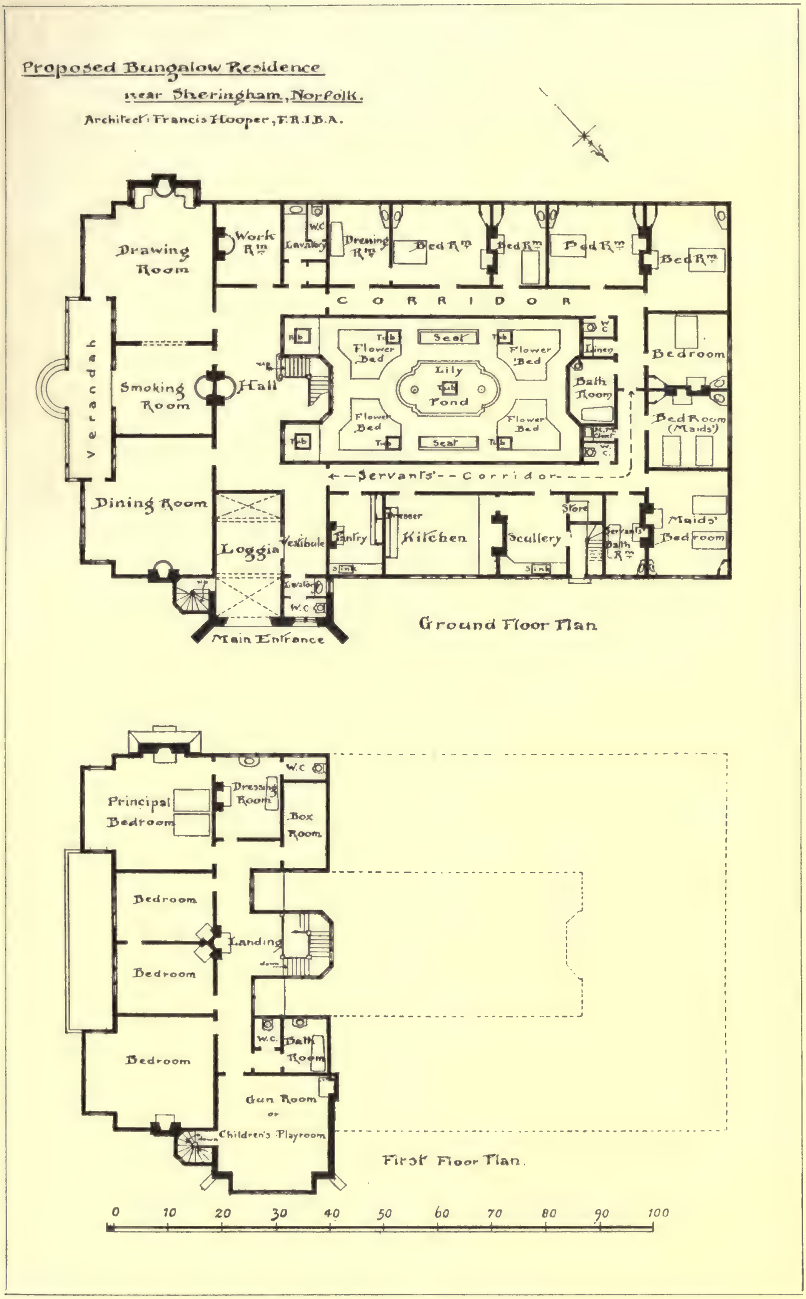
MAIN BUILDING.

Ground floor.—Breakfast and dining rooms.

First floor.—Drawing-room and bedroom.

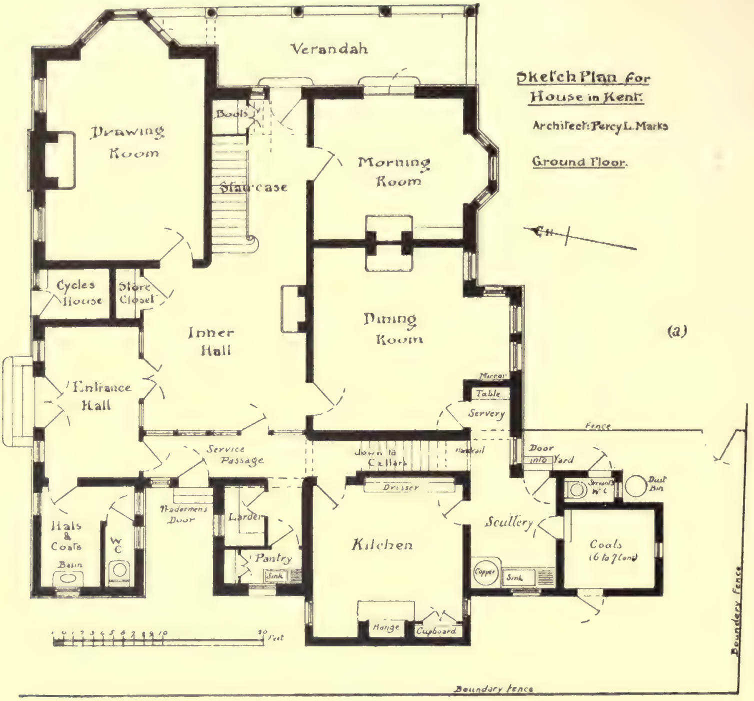
Second floor.—Two bedrooms, bath-room and W.C.

Plate LXXXI.


Proposed Bungalow Residence
near Sheringham, Norfolk.
Architect: Francis Hooper, F.R.I.B.A.
Drawing Room
Work Rm
W.C
Lavatory
Dressing Rm
Bed Rm
Bed Rm
Bed Rm
Bed Rm
CORRIDOR
Verandah
Smoking Room
Hall
up
Tub
Tub
Seat
Tub
Flower Bed
Flower Bed
Lily Pond
Tub
Flower Bed
Flower Bed
Tub
Tub
Seat
Tub
W.C
Linen
Bath Room
Bedroom
Bed Room (Maids')
St. Pe. Closet
W.C.
Servants' Corridor
Dining Room
Loggia
Vestibule
Lavatory
W.C
Pantry
Sink
Dresser
Kitchen
Scullery
Sink
Store
Servants' Bath Rm
Maids' Bedroom
up
Main Entrance
Ground Floor Plan
W.C
Principal Bedroom
Dressing Room
Box Room
Bedroom
Landing
down
Bedroom
W.C.
Bath Room
Bedroom
Gun Room or Children's Playroom
down
First Floor Plan
0
10
20
30
40
50
60
70
80
90
100

90^2

Plate LXXXII.

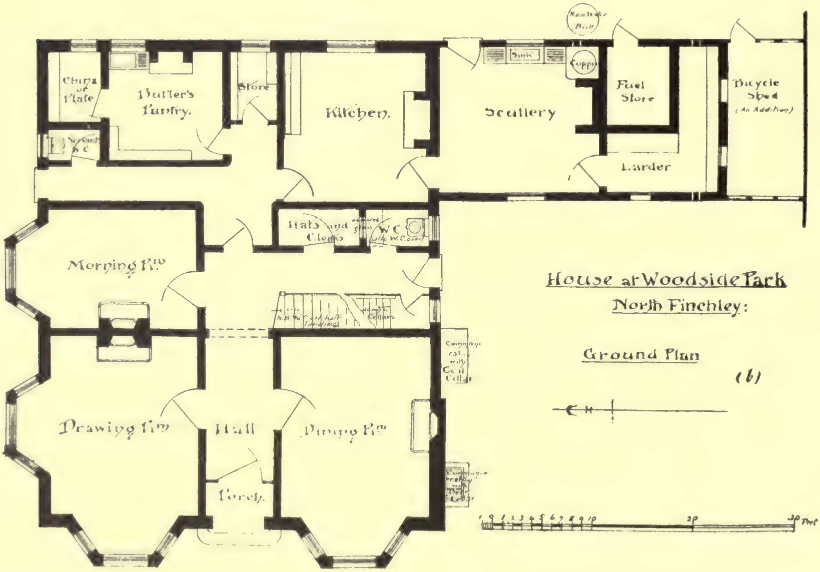


Sketch Plan for House in Kent.

Architect: Percy L. Marks

Ground Floor.

(a)



House at Woodside Park North Finchley:

Ground Plan

(b)

OUTBUILDING.

Ground floor.—Kitchen, scullery, larder, coal-store and servants' W.C.
Off stair-landing.—One bedroom.

A twelve-roomed house might have, as *additional* accommodation to the above, a study and four other rooms (bed and dressing).

A sixteen-roomed house might, in addition to the last, consist of a billiards-room, servants' hall, and two more bedrooms; or one of the rooms might be a gentleman's room (for the occupier to transact his business in) and another might be a boudoir.

The above scheduling may seem somewhat arbitrary, but it is merely intended to give a fair idea of what is frequent in such houses. It is possible that the question often arises in an architect's mind as to the basis—the principle whereon the sizes of rooms have to be calculated. However, it requires but little reflection to recognise that the basis is to adapt each room to its fixtures, fittings, and fitness (perhaps the alliteration will aid as a mnemonic guide). By fixtures is to be understood the necessary windows, doors, fireplaces, &c.; fittings imply the furniture, and fitness refers to the use to which the room is to be devoted.

The following may be taken as the *minimum* sizes of various rooms under *ordinary* conditions:—

Breakfast-room	11 ft. by 10 ft.
Dining-room	16 ft. by 13 ft. (or 14 ft. by 14 ft.)
Drawing-room	17 ft. by 16 ft. (or thereabouts).
Billiards-room (for a three-quarter table)	21 ft. by 18 ft.
Kitchen	11 ft. by 10 ft.
Best bedroom	13 ft. by 11 ft.
Other bedrooms	9 ft. by 8 ft.

In large country houses, the breakfast and dining rooms* may advisedly be approximately equal in area, though the latter should be treated more formally as regards decorative effects. Even if, on the one hand, the dinner party be augmented by the presence of a few local guests, the difference would be so slight, as to render a liberal allowance of room for the house-party adequate for the augmented numbers. On the other hand, it is seldom (even when hounds throw off) that all the members of a house-party breakfast simultaneously, and it might therefore be assumed thoughtlessly, that the required accommodation would be less than for the dining-room. This would be erroneous, for a possible simultaneous assemblage should be provided for; consequently the accommodation should be in keeping with that allowed in the total sleeping provision. In making the necessary calculations, some of the dressing-rooms should be regarded as possible bedrooms; and in any case, it is well to bear in mind that it is better to be generous than niggardly in providing accommodation.

---

* Sometimes the breakfast-room is omitted from large country houses, the dining-room being used throughout.

The reason why a breakfast-room in a small house is permissibly smaller than the dining-room is of course due to the fact that a householder frequently has guests for the evening meal, whilst merely the members of the household are present at breakfast. As regards the accommodation for a breakfast-room, it would be an improvement were people generally to recognise the advantages accruing from the use of a round table. Consider the minimum dimensions given above, viz., 11 ft. by 10 ft. This gives but a small room, and the fewer salient angles the better under the circumstances. A round table (say) 5 ft. diameter would in practice accommodate as many people as a square one of 5 ft. sides—that is, such a table in such a room would seat comfortably seven or eight people, and leave more room for the fireplace and necessary furniture than would be obtainable with the square table.

It may be considered as an incidental advantage that the use of a round table removes any air of formality, which a rectangular one might impart. And sometimes instances occur where householders prefer a round dining-table; when a house is being planned for such, a square room would look very well. An oblong table in a square room does not look very appropriate, when the latter is at all proportionate in size to the area of the table.

In planning a dining-room, if particulars of the requirements are not given or obtainable, an average number of persons should be provided for, proportional to the size and style of the house. It is not possible to give any hard-and-fast ratio, but the architect should not find it difficult to estimate the number. Proportionately more liberal allowance should be made for a house of high social standing, than for the average middle-class dwelling; and also for either of the above, as compared with the allowance for a school, for more than one reason:—Firstly, adults are of greater average bulk than children; and secondly, the table in a private house is not merely a receptacle for solid food, but should provide opportunity for floral decoration, for which additional space is requisite. School children can dispense with épergnes of flowers, dishes of fruit, and two or three kinds of wine; a "good square meal" meets their views to perfection, and it is only as years and dyspepsia creep on, that the eye requires satisfaction as well as the appetite.

A table 3 ft. 3 in. to 3 ft. 9 in. wide or more is requisite under the circumstances. A length of table amounting to 2 ft. 3 in. per person should be provided, and ample accommodation in the room for service and for furniture is necessary.

Supposing the number to be provided for were twelve, this would give one each at head and foot of table, and five on either side. The table would then be 12 ft. long by (say) 3 ft. 6 in. wide. Allow 3 ft. gangways, 18 in. for seating and 18 in. for furniture, and a room 29 ft. 3 in. by 16 ft. 6 in. is obtained. Tabulated it is as shown here:—

	Ft.	In.
7 (5+2) times 2 ft. 3 in. table	15	9
2 ,, 2 ft. seating -	4	0
2 ,, 3 ft. gangway -	6	0
2 ,, 1 ft. 9 in. furniture -	3	6
Length of room -	29	3

	Ft.	In.
Table, say -	3	6
2 times 2 ft. seating -	4	0
2 ,, 3 ft. gangway -	6	0
2 ,, 1 ft. 6 in. furniture -	3	0
Width of room -	16	6

It will readily be recognised that even in terrace houses such a room is not infrequent, taking in the whole width of the house for the length of the room and occupying about half the depth of the main building.

The fireplace must be borne in mind. If it is at the end of the room, it is most probably the best position ; for if any one is to be made uncomfortable by the proximity of the fire, it should not be one of the guests. The fire-curb or fender would encroach on the 2 ft. gangway, except provision were made for its prevention.

A drawing-room cannot be calculated ordinarily on the basis of either fixtures or fittings. Aspect and Prospect are powerful factors in planning this room, and further mention of these will be made later on ; but 8 ft. to 10 ft. super. per person is a fair allowance in accommodation, inclusive of furniture. The reason why exact calculations cannot be made is, that a drawing-room has not any definite belongings or limits. There would probably be a piano, but it might be an "upright grand," which takes less room than a "concert grand" ; there would be chairs, settees, tables and cabinets, but it would all be too hazy in detail, unless a client specifically mentions the furniture to be accommodated.

The following notes in regard to a Library, extracted from a paper read very many years ago by Mr John Leighton, are of interest :—"There should be but one external wall, and that north, thus ensuring an even, steady light, without glare of sunshine or heat, which parches and causes the colours to fade. A room on the first floor or above a vaulted chamber is preferable as tending to keep the books dry. Bookcases should not approach too near to the ceiling, where the air is hot and vitiated, tending to destroy leather. The lowest shelves may well project at least 18 in. for folios, thus providing a ledge whereupon to rest these and similar large and bulky works. A gallery is a useful feature in a library. The shelves throughout should by preference be of one width, so that books may be transposed *en masse*, when necessary. Bookcases may be

Plate LXXXIII.

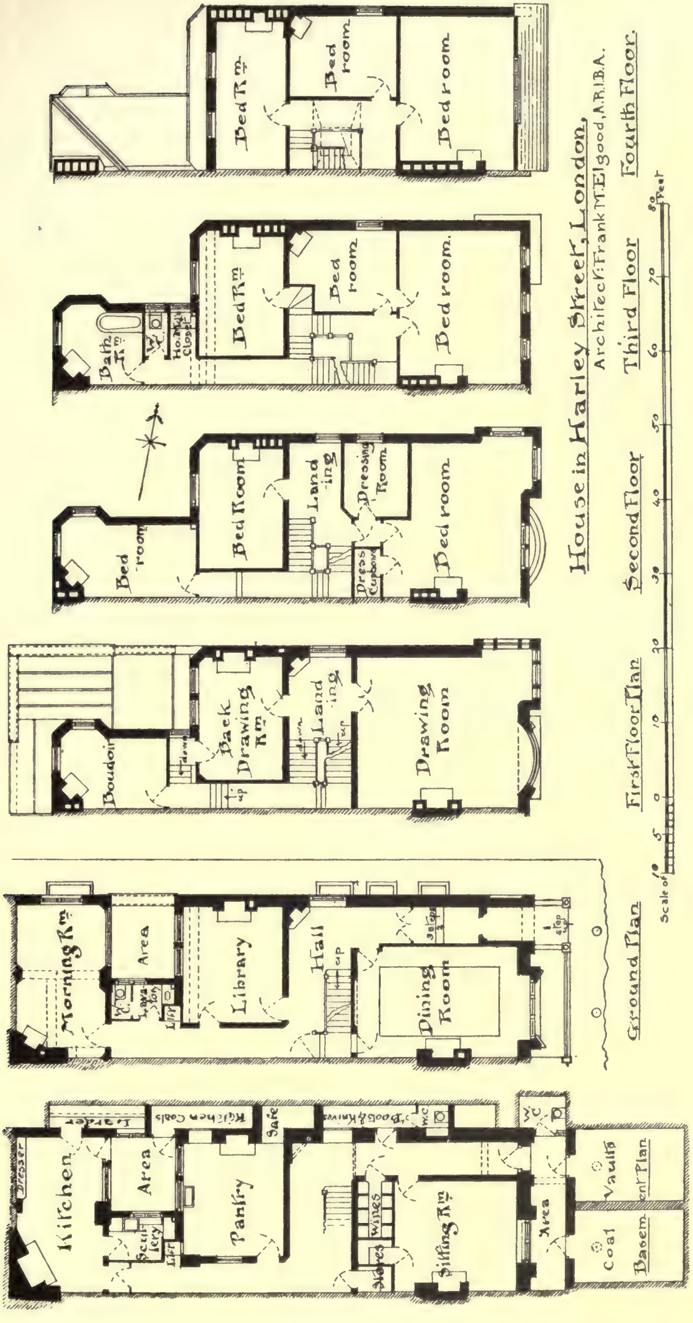
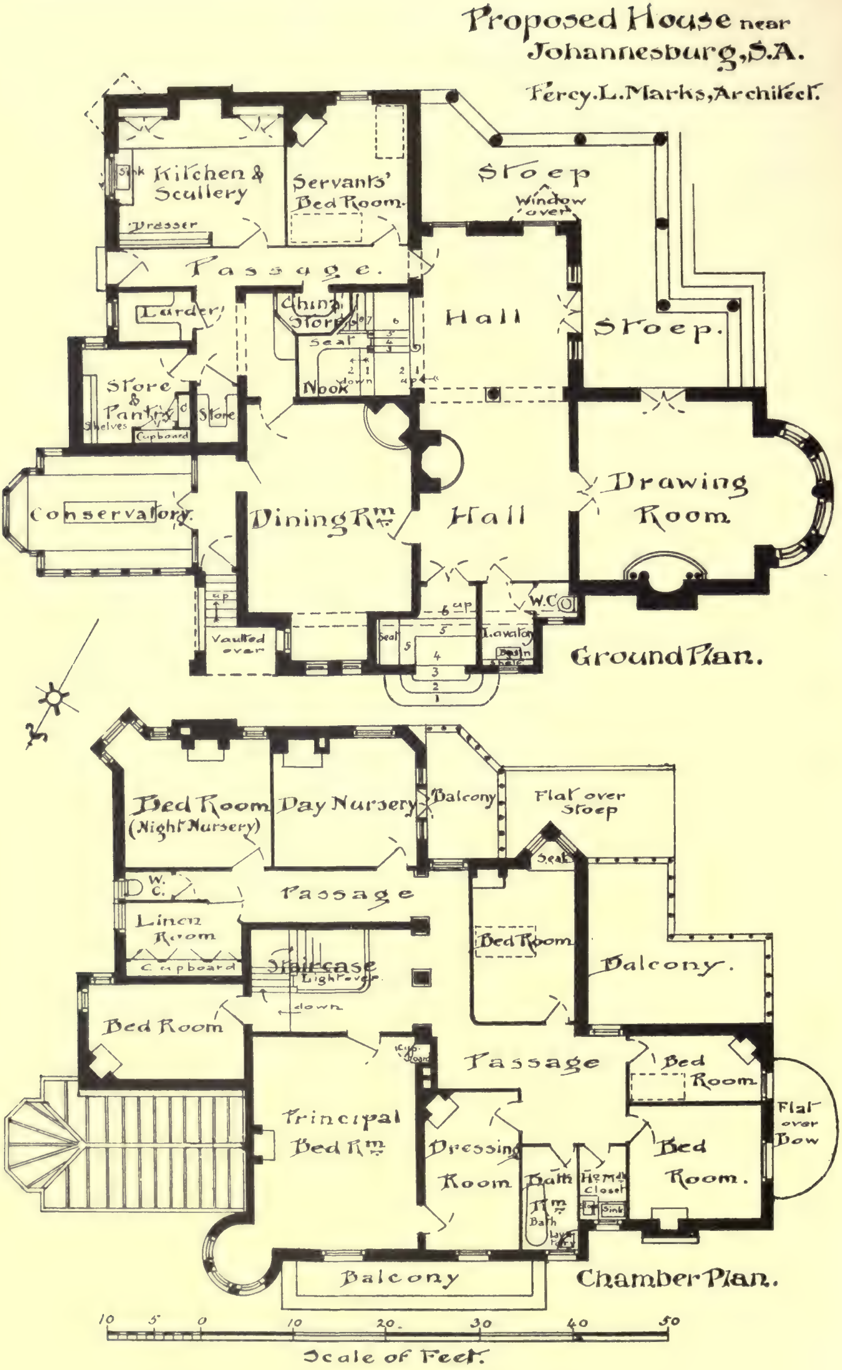


Plate LXXXIV.



Proposed House near Johannesburg, S.A.
Percy L. Marks, Architect.

advisedly not more than 4 ft. wide and not deeper than royal 4to on the upper tiers."

A Study requires consideration more from the point of view of aspect and seclusion. A left-hand light to the table is desirable, and a dry aspect should be provided if bookcases are to be placed in the room. A good arrangement is to have the window on the left of the student, the fireplace behind him, and the door forward on the right side.

A Billiards-room has the table as the basis of calculation. A full-size table is 12 ft. by 6 ft.; a three-quarter table is 9 ft. long by 4 ft. 6 in. wide. A 6 ft. gangway should be provided surrounding the table, and extra room is desirable for spectators and for the fireplace. On this basis and for a full-sized table the minimum size for the room is 24 ft. by 18 ft., though sometimes a width of only 4 ft. or 4 ft. 6 in. for the gangway is given.*

These are the sizes of tables as built:—12 ft. by 6 ft.; 11 ft. by 5 ft. 6 in.; 10 ft. by 5 ft.; 9 ft. by 4 ft. 6 in.; 8 ft. by 4 ft.; 7 ft. by 3 ft. 6 in.; and 6 ft. by 3 ft. From smaller-sized billiards-rooms fixed seats may preferably be omitted. A sanitary annexe should be provided in connection with this room.

The tables are 3 ft. in height to the top of the cushion and are supported on eight legs. In rooms specially built there should be wood or stone blocks let into the floor for supporting the legs of the table; these blocks should be not less than 7 in. square, and may advisedly project very slightly above the floor level, in order to prevent vibration. A full size table weighs from 1½ to 1¾ tons.

Bedrooms essentially require to have the furniture taken into account. The following give ordinary sizes for sundry articles:—

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* Using the smallest gangway mentioned and the smallest size of table, a room 14 ft. by 11 ft. can be used for the purpose. On the other hand, a public room for (say) two full-size tables should be either 42 ft. by 28 ft., or alternatively 30 ft. by 24 ft., exclusive of all projections. A banquette 12 in. high should encompass the walls, having seats about 2 ft. high.

	Ft.	In.		Ft.	In.	
Single bed	6	0	by	2	9	to 6 ft. 3 in. by 3 ft. 3 in.
Double bed	6	6	,,	4	6	
Wash-hand stand	2	3	,,	1	3	and upwards.
Chest of drawers	3	3	,,	1	8	,,
Dressing-table	3	3	,,	1	9	,,
Wardrobe	4	0	,,	1	6	,,

Many bedrooms are not supplied so liberally, of course, but every such room requires a bed, a wash-hand stand, a chest of drawers and at least one chair. The fireplace must also be taken into account, and it is well to utilise one of the chimney recesses for a fitment, such as a hanging closet.

As this book deals essentially with principles and their application, it will be as well to demonstrate why the minimum permissible size for a bedroom has been given as 9 ft. by 8 ft., though it must be noted that this size of room is not recommended for comfort.

			Ft.	In.
The requisite area	for a	single bed averages	16	6
,,	,,	wash-hand stand	2	10
,,	,,	chest of drawers	5	5
,,	,, (say)	two chairs	3	0
,,	,,	fireplace (with hearth)	9	0
,,	,,	door space, say	8	0
,,	,,	gangway, say	30	0
			74	9

Therefore 9 ft. by 8 ft. would practically supply these requirements. Smaller bedrooms are, however, sometimes provided, when presumably the 30 ft. of gangway is considerably lessened. It may be noted here, that as the medical profession is apt to ask 1,000 cub. ft. of air space per head in a *living-room*, such a *bedroom* as noted above would not be likely to meet with a doctor's approval, as it is very unlikely that a height of 13 ft. 6 in. would be obtainable; and even if it were, people have a curious disinclination to sleep in a cavern; a bedroom 9 ft. by 8 ft. by 13 ft. 6 in. high is too awful to contemplate. This work does not pretend to deal with hygiene, but it might be well to remark that the hygienic requirements are said to be 3,000 cub. ft. of fresh air per hour per individual, and the air of a room may be

[Between pp. 96 and 97.

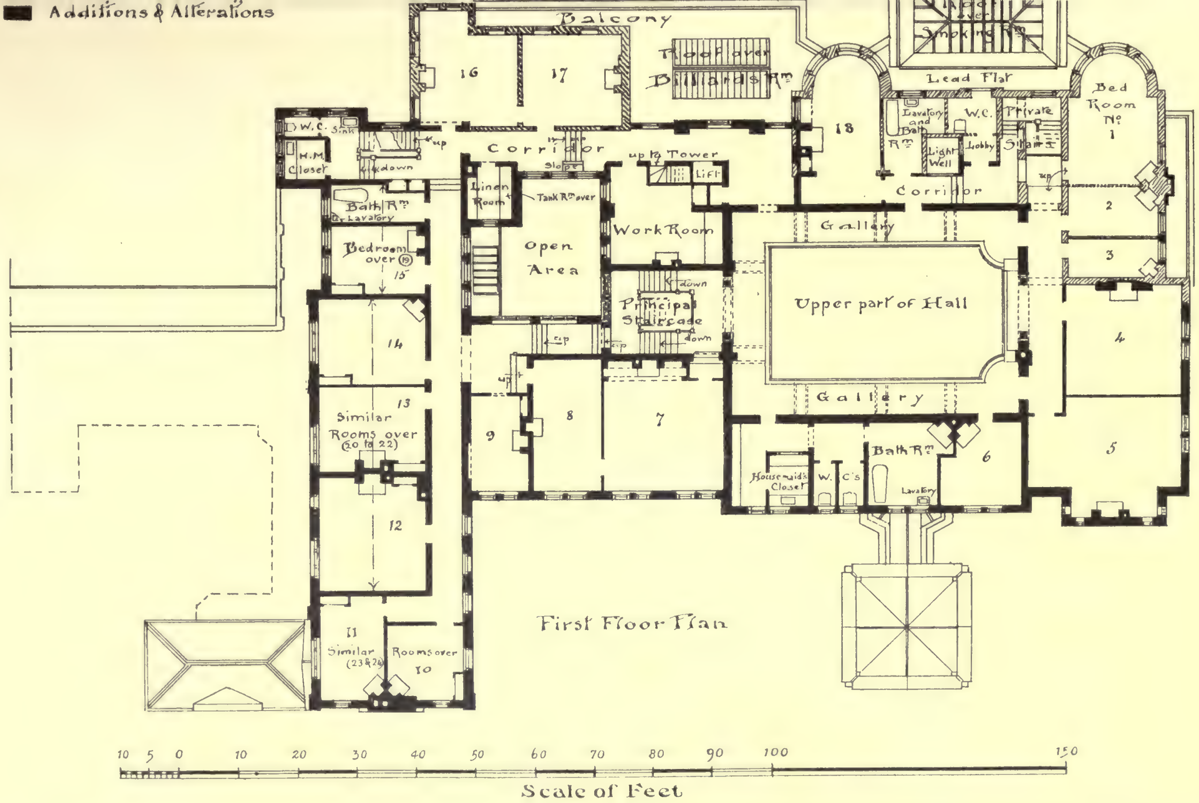
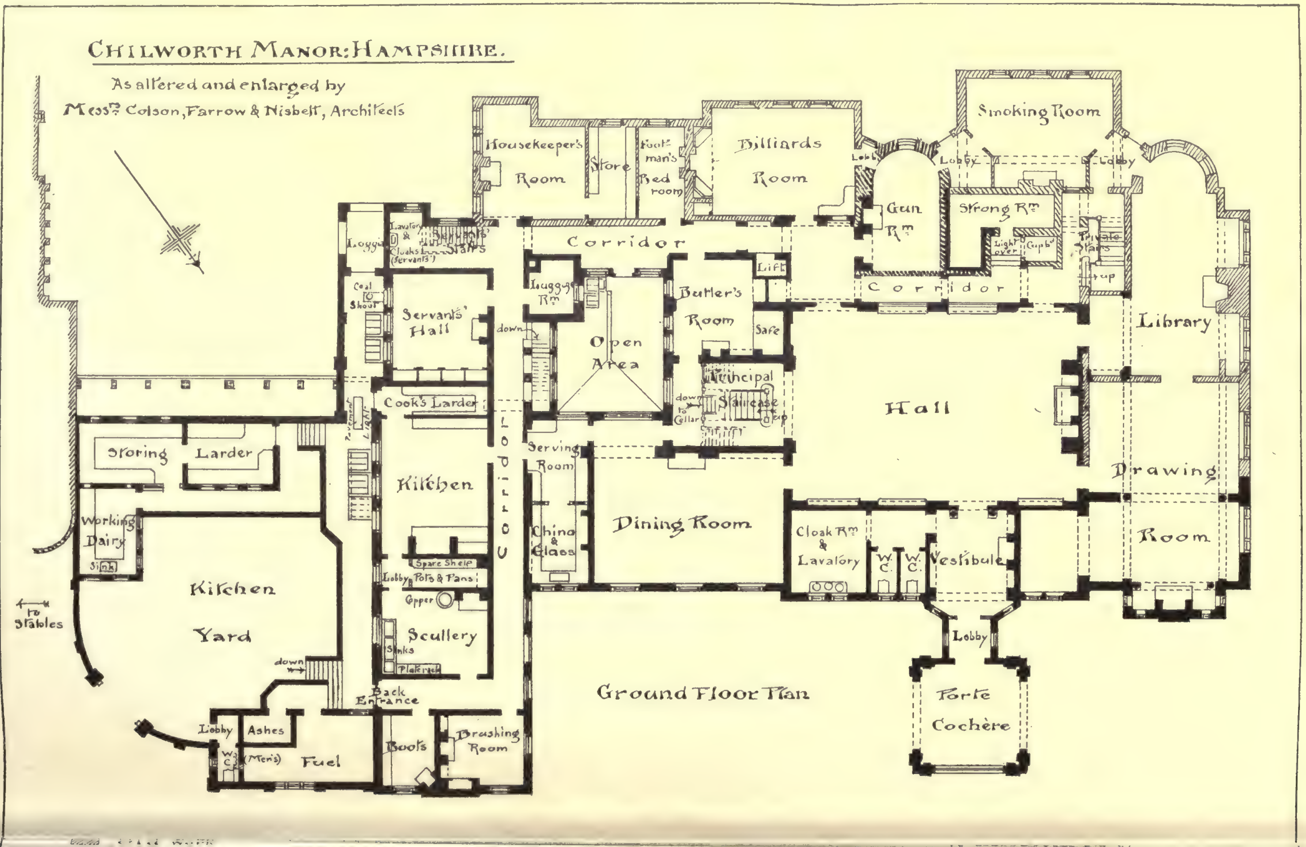


Plate LXXXV.

96²



CHILWORTH MANOR: HAMPSHIRE.

As altered and enlarged by Messrs. Colson, Farrow & Nisbett, Architects

Ground Floor Plan

completely changed three times an hour comfortably. This will explain the reference to an air space of 1,000 ft. mentioned above.

In regard to the area for the door-opening, it has been calculated as the width of an ordinary bedroom door (2 ft. 8 in.) by the dimension 3 ft. (which is taken as from centre to centre of the architrave); this will give the ground covered by the sweep of the door; it would, however, be fairly permissible to have included this in the provision for gangway.

One reviewer of this book suggested that calculations based as above would not work in practice, and that on drawing out such a room, the furniture would not fit in feasibly. The accompanying plans (see Fig. 21) will serve to confute this criticism. They have been drawn faithfully from the dimensions given for a kitchen and a medium-sized bedroom. *Fiat experimentum.*

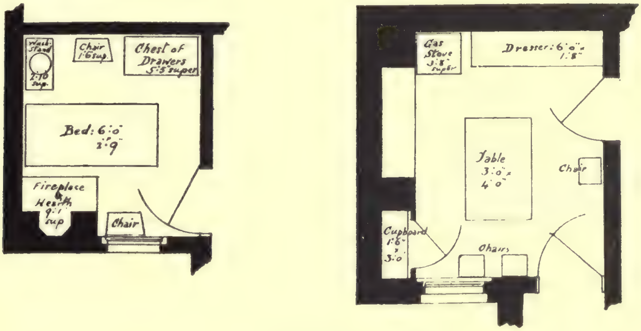


FIG. 21.

The minimum size for a kitchen would be demonstrated thus :—

	Super. Ft.	Super. In.	
Dresser, say 6 ft. by 1 ft. 8 in.	10	0	
Table, 4 ft. 6 in. by 3 ft.	13	6	
Fireplace (with hearth), 8 ft. by 3 ft.	24	0	
Cupboard, 3 ft. by 1 ft. 6 in.	4	6	
Two door spaces, each 3 ft. by 2 ft. 10 in.	17	0	for the two.
Gas stove, allow say	3	8	
Three chairs, each 1 ft. by 1 ft. 2 in.	3	6	for the three.
Gangway, say	35	0	
	111	2	in all

which a room 11 ft. by 10 ft. will yield. 35 ft. of gangway as above would in practice be 2 ft. 4 in. width of space all round the table, for 2 ft. 4 in. by 15 ft. is equal to 35 ft. super.; this is indeed somewhat restricted for comfort, but is quite workable.

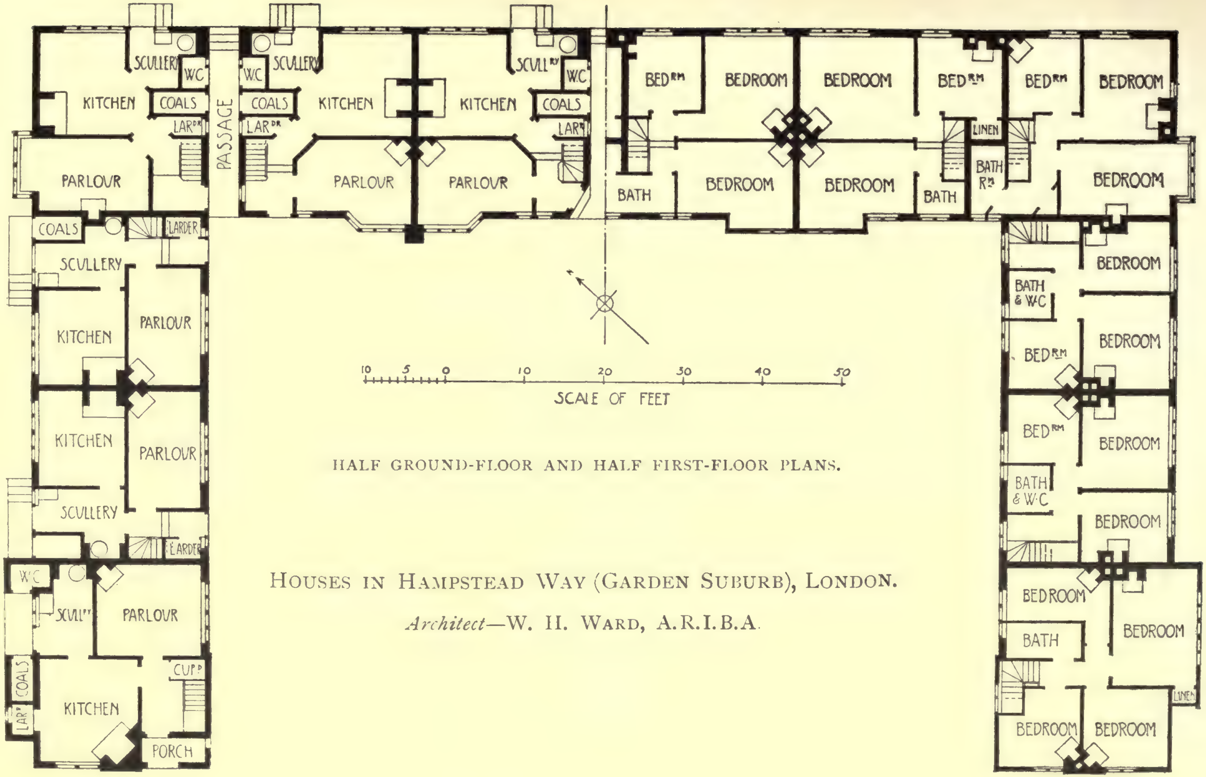
The linen-room is a desirable adjunct to any house, but where space is limited, a cupboard (with open-batten shelves, and heated by the hot-water circulating tank) will answer the purpose. This would suitably be placed in the bath-room. Even simpler arrangements have proved successful, where an ordinary cupboard adjoining the kitchen flue (and backing against a similar flue of the next house) has been allotted to spare linen.

The linen-room proper should be dry, well ventilated and well heated. The heating may be either by an open fire or by hot-water coils placed in the presses. The latter are fitted with shelves, drawers and sliding open-batten trays. There should be a dresser near the window for use in folding *lingerie.* Bedding will require specially broad presses.

Bath-rooms should provide sufficient room for a bath, a lavatory basin and the necessary standing space; anything more is waste. The provision of water-closet apparatus in a bath-room, though sometimes met with, and at times requisite from a medical point of view, is otherwise to be deprecated. Bath-rooms are often duplicated, one being provided for the exclusive use of the domestics. In larger houses these rooms are reduplicated for the mutual convenience of hosts and guests. All this may, however, be simplified at the present day by the introduction of a slipper bath in the various bedrooms; set on pivots, and enclosed in a wood cabinet, and having a flexible but strong "waste," this arrangement ensures the maximum of luxury, accompanied by the provision of a fresh fitment, admitting of artistic treatment.

A butler's pantry has to be provided with a sink and cupboard and a table. Frequently (in larger establishments) the butler's bedroom and pantry are *en suite*, and a plate-safe

Plate LXXXVI.

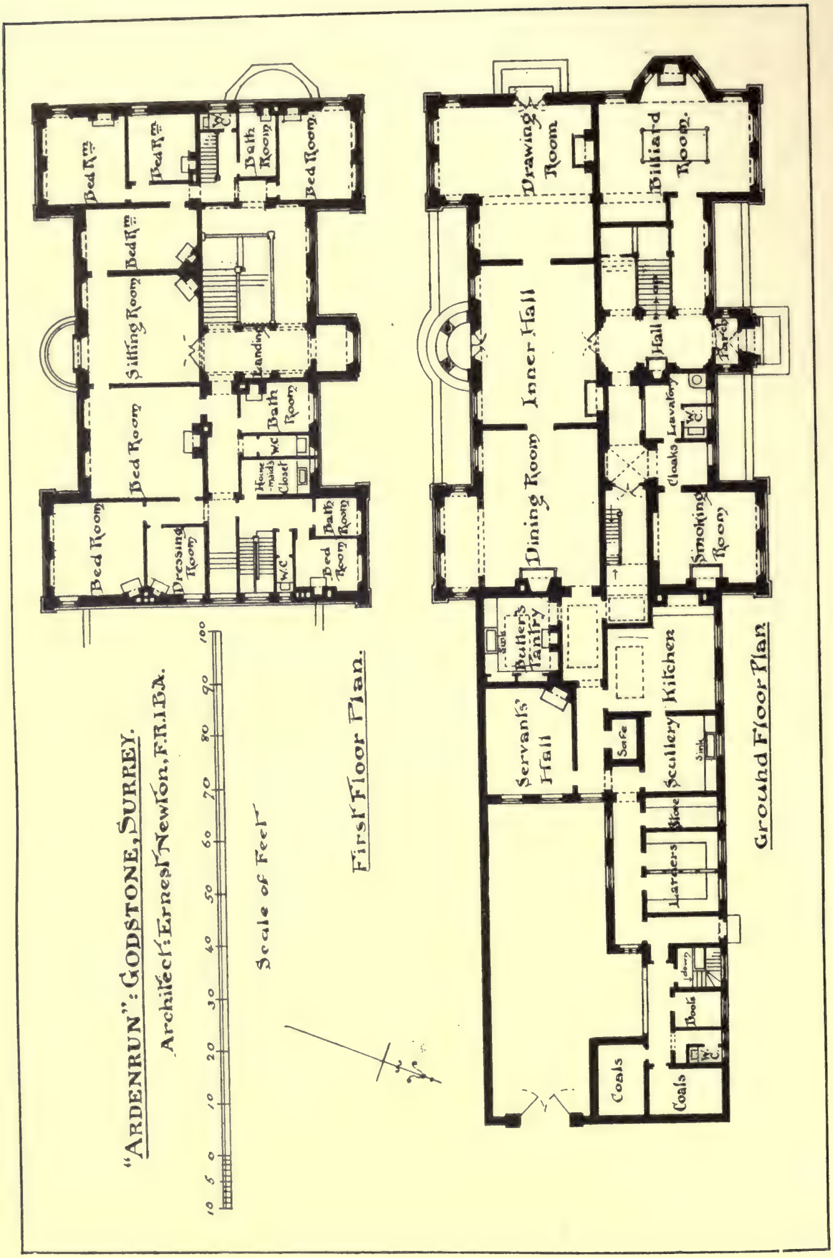


HALF GROUND-FLOOR AND HALF FIRST-FLOOR PLANS.

HOUSES IN HAMPSTEAD WAY (GARDEN SUBURB), LONDON.

Architect—W. H. WARD, A.R.I.B.A.

Plate LXXXVII.



opens out of the bedroom. In size, the pantry may be 12 ft. to 14 ft. square and upwards.

A scullery is usually furnished with a sink or sinks, a copper and very often also with a small range.

Other rooms do not call for special remarks, but a few words may fitly be introduced respecting corridors. What is the purpose of a passage? As implied by its name, it is a means of passing from one room to another, and in practice it is intended to supply the means for separate entrance and exit to the several rooms; this object once comfortably attained, any further provision should be minimised.

A good entrance-hall is always desirable, though frequently unattainable, and in larger establishments there will probably be porch, vestibule and entrance and inner halls. In passing it may be noted that a corridor is usually considered as a glorified passage.

There are cases when extra passage-way is a desideratum, *e.g.*, a private service-passage from the kitchen to the dining-room is to be commended. In such an example, as shown in Fig. 22, rapid and private transit is secured, and kitchen odours are not communicated. The objection sometimes urged against the multiplicity of angles is in this instance more academic than practical, and even from the former standpoint is not of great weight. 3 ft. 6 in. should be regarded as the minimum width for a passage, enabling two people to pass each other without discomfort; and in order to secure this minimum, it will be worth while abstracting what is necessary in width from the contiguous rooms.

The provision of nurseries is confined as a rule to those houses where it is specifically demanded, and this is only natural; for, in the case of speculative houses, the speculation is not allowed to extend to the matter of babies who, as unknown quantities, are not deemed worthy of consideration. Two rooms are required for the children—a day-nursery and a night-nursery, and the nurse should have a cubicle or a bedroom close by; there should also be a small spare room adjoining, where either of the children suffering from colds or similar childish ailments should be isolated. A bath-room,* W.C., scullery, larder and pantry should also be provided; in fact, the nursery department should be microcosmic. There should be good-sized cupboards provided. The two nurseries often intercommunicate, but this is not to be recommended, approach more advisedly being made to each room separately from a corridor in common.

The planning of a town house differs considerably from that required for the country; that is to say, there are certain factors introduced, that necessitate differences. In the first place there is the restriction customarily imposed by the presence of party-walling, thus reducing the freedom of window-provision, which is such a desirable quality in scientific house-planning. In regard to ground rents, the prior value attached to quantity over quality (relatively not absolutely, be it understood) introduces another factor, by providing a restricted site for the disposal of the rooms; and this is of further application by reason of the narrow frontage too often allotted to the site, from the same economic consideration.

Consequently, the architect, in dealing with the typical town house, is confronted with the restrictions of limited site, limited frontage and curtailed freedom of lighting. It is not, of course, contended that detached and semi-detached houses are not of frequent occurrence in towns, but they are not typical.

As a combined result of these restrictions, the "wing" arrangement of plan, providing rooms on either side of the hall or passage, is customarily set aside for the lop-sided plan, where one good front room is provided on the entrance floor, with the hall coursing along its flank, and on the first floor a better room results from the inclusion of the space allotted to the hall below. Smaller rooms in the rear obtain on the different floors; and understood generally the typical town house of the "terrace" class has its rooms disposed thus:—

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* A child's bath is 4 ft. long by 1 ft. 7 in. wide over all.

Floor.	Front.	Rear.	Wing Building in Rear.
Basement -	Breakfast-room, and Passage to Coal-cellar and Tradesmen's Entrance.	Kitchen.	Scullery and Offices.
Ground (Entrance)	Dining-room and Entrance Hall (with Lobby or Vestibule).	Study (or Library) and Staircase, &c.	Third Room, or Cloaks and Lavatory.
First Floor -	Drawing-room.	Bedroom [or small (second) Drawing-room].	Bath-room (or Bedroom).
Second Floor	Bedroom and Dressing-room.	Bedroom.	Bedroom (or Bath-room & W.C.).
Third and other Floors	Bedrooms and Box-room.		

Where stables are provided, they are usually congregated for a terrace of houses (or for several terraces) within one block of mews in the rear; for houses of this status, which may be frequently met with, the above table is not sufficiently typical as regards the basement, where more rooms obtain by the provision of a greater depth of site and the introduction of "light" areas; housekeeper's room, servants' hall, butler's pantry and bedroom, with kitchen, scullery and offices, form the typical basement plan of such a house, the ground floor providing morning and dining rooms and library (or study), the first floor accommodating the drawing-rooms (front and back), and the bedrooms being above.

It would be impossible and profitless to schedule all the variations of disposition, but the above will sufficiently indicate the customary arrangements.

A few remarks in regard to cellars may, however, find place herein. A wine-cellar may by preference be unprovided with brick bins;* portable bins are now obtainable, and they have the advantage of rendering the withdrawing of any one bottle an easy matter; and moreover, they are a tenant's fixture, so that if the cellar *space* be enclosed, it is all that is necessary in this respect; but care has to be exercised that such cellar is not subject to variations of temperature. To this end, it is advisable to place the wine-cellar towards the centre of the house, and to approach it also through an outer cellar, whose door should be kept locked. Artificial heat is not considered desirable, but cold cellars may have their temperature regulated by a gas jet or so, with ventilating provision for outlet of vitiated air. The temperature under ordinary conditions should not exceed 60° Fahr., but 55° Fahr. is preferable. For clarets and perfectly fermented wines 45° Fahr. should be the maximum. In any case uniformity of temperature is the goal to be attempted.

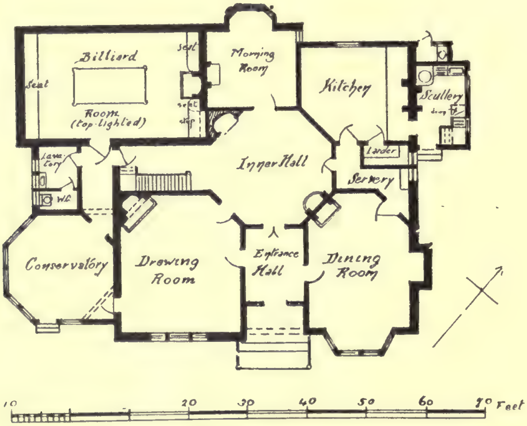

FIG. 22.—DESIGN FOR HOUSE IN SURREY, BY PERCY L. MARKS.

A Beer-cellar should be provided with stone shelf or shelves,

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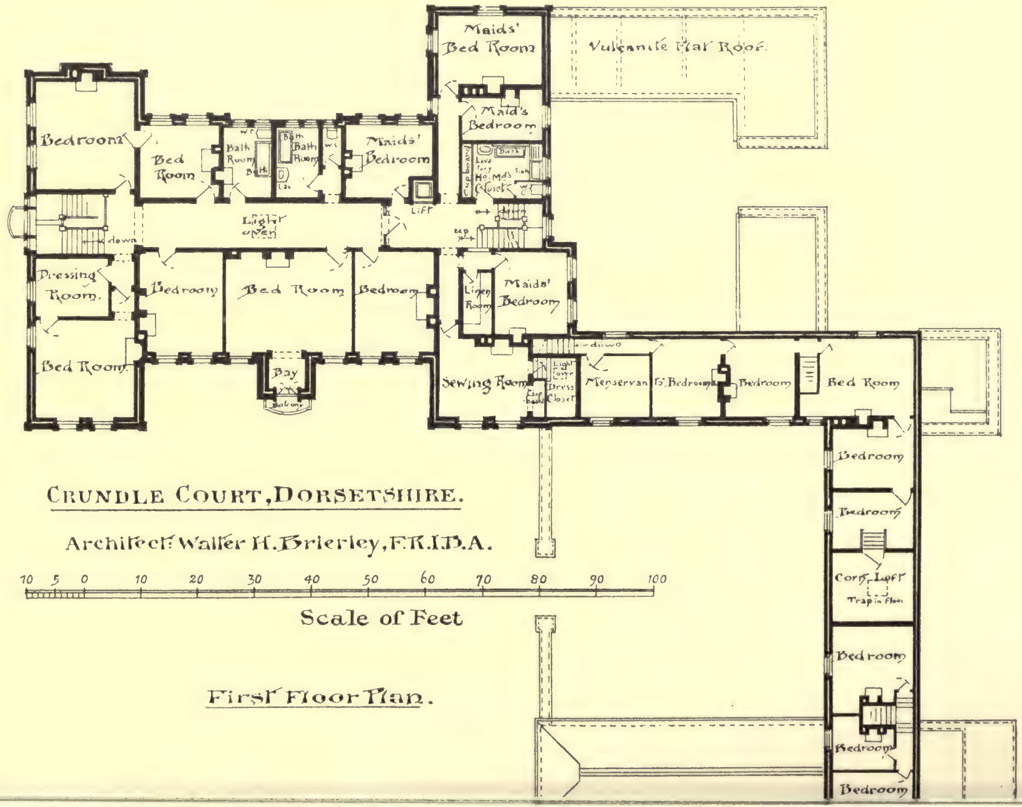
* 2 ft. to 2 ft. 6 in. square for vertical area by 1 ft. 10. in. deep from front to back is the size of the average bin, with 4½ in. brick sides, stone slabs above and below, and 9 in. (or more) brick enclosing walls. A vaulted crown is desirable. Portable bins are 1 ft. 1 in. on base by 1 ft. 2½ in. high (for 1 dozen bottles), to 4 ft. 0½ in. by 3 ft. 8 in. high (for 12 dozen bottles) by 12 in. depth for single bins. Double bins are 1 ft. 6 in. deep.

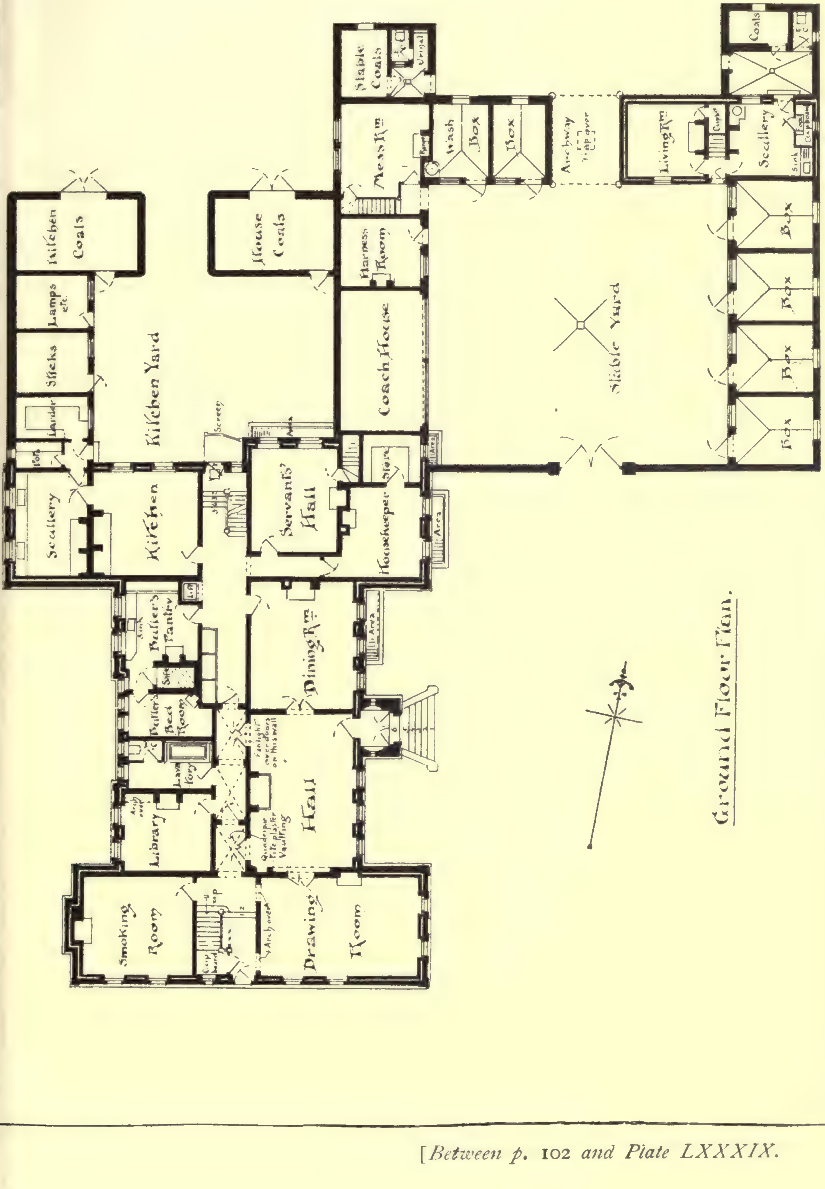


CRUNDLE COURT, DORSETSHIRE.

Architect: Walter H. Brierley, F.R.I.B.A.

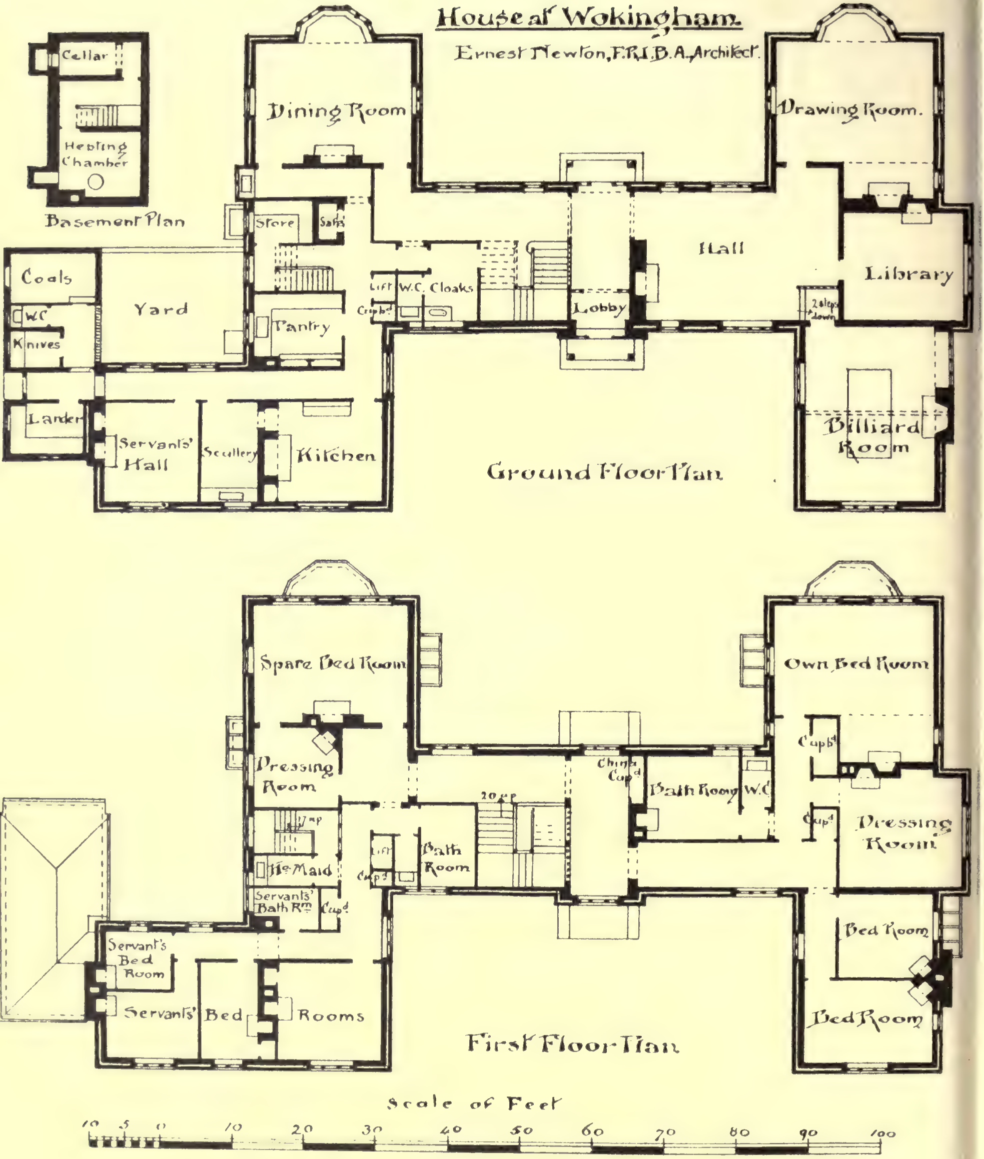
First Floor Plan.

Plate LXXXVIII. 102²


Ground Floor Plan.

[Between p. 102 and Plate LXXXIX.

Plate LXXXIX.



House at Wokingham.

Ernest Newton, F.R.I.B.A., Architect.

and if below the level of the delivery-van, needs a skidway, with either a lift or inclined plane for lowering the barrels.

A Coal-store has its size usually calculated on the basis of 45 cub. ft. for every ton of coal required, and not more than 4 ft. 6 in. height for the coal should be calculated.

It is not in a book such as this, that space can be devoted to considering all the rooms that may possibly be provided. Those that have been briefly dealt with are such as are found in many houses that would not be ranked as large mansions. But housekeeper's room, servants' hall, gun-room, still-room and others are not everyday provisions and their treatment has been well and fully considered in specialised works. It

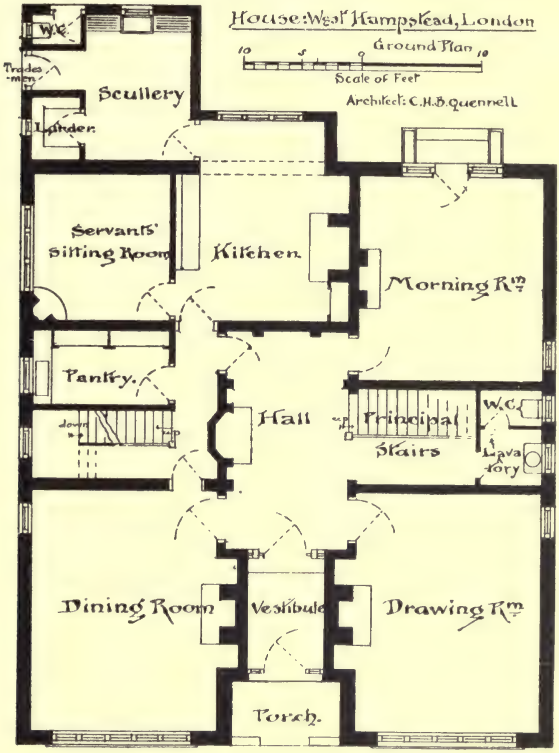


FIG. 23.

would be agreeable to the author's feelings to survey domestic architecture from the mud hut to the mansions in the skies, but he must refrain. He is, however, for the interest attaching to the contrast, tempted to give the following two extracts from magazines published by Messrs Gilbert Wood & Co.:—"What is believed to be the smallest inhabited house in Great Britain is to be seen at Llandyssul, South Wales. Built by the owner, a bachelor, who occupies it, it has a frontage of 5½ ft., is 6 ft. from front to back, 6 ft. from ground to eaves, and about 4 ft. more to the ridge. Near it is his carpenter's shop, which measures only a little more than the house, having an 8 ft. frontage. From front to back it is 7 ft., to eaves 8 ft., and to ridge about 12 ft." (From the *Architect* of 21st Nov. 1906.) The second extract is from the *Building Trade* of 5th Dec. 1906: "The £300,000 mansion being built by Mrs. Clarence Moore at Washington will contain sixty bath-rooms. Mrs. Moore's private bath will be a work of art. It will be constructed in imitation of a cave, with stalactites hanging from the roof. The tub will be a rose-coloured shell, and on the walls will be representations of aquatic plants. The floor will be covered with a rug in moss colour."

There are various plans of houses given in illustration in this Chapter and elsewhere, and though such extremes as quoted above are not amongst them, a great variety in size, accommodation and treatment will be observable. Respecting the plans of "Hazelwood" (Plate XC.)—a house built for the Rev. Mr Gladstone (a cousin of the famous statesman)—the architects, Messrs Hubbard & Moore, have kindly furnished the following interesting notes:—

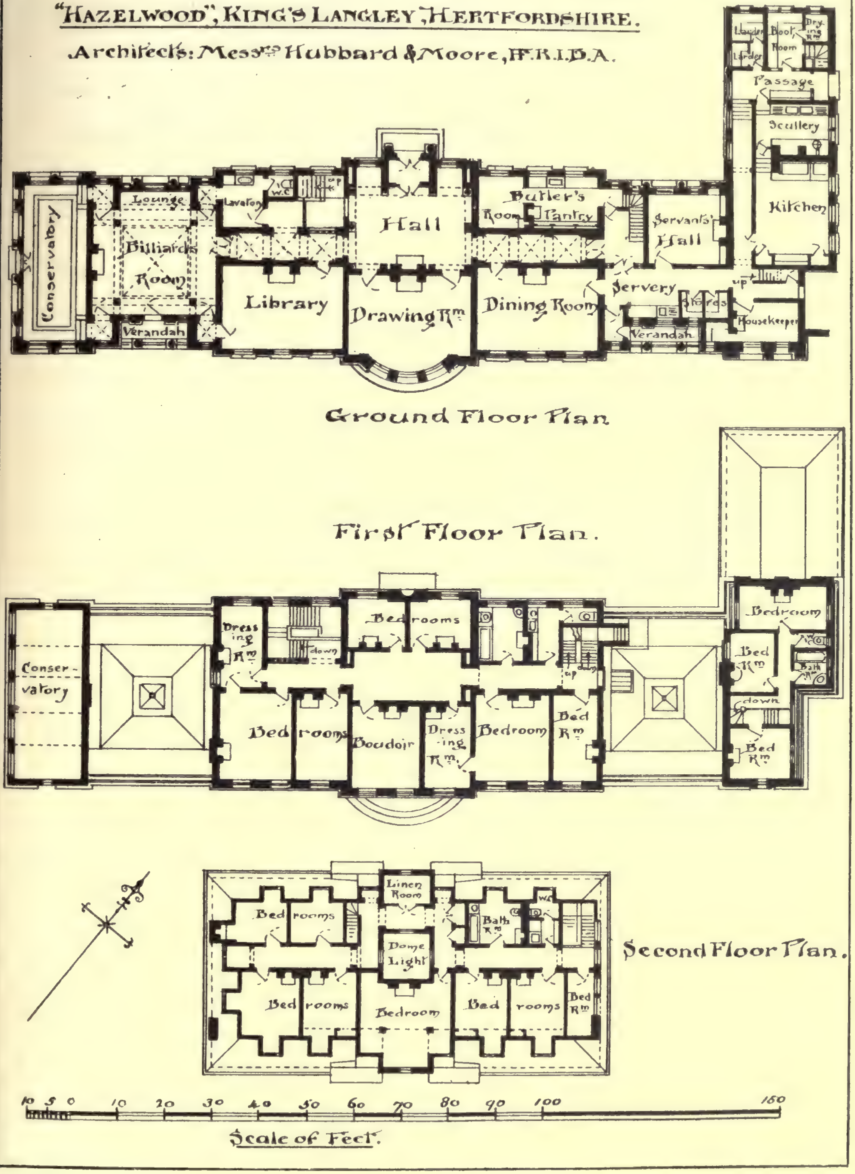
The ground falls away sharply from the house on all sides, except on the northern façade, and steps lead down from the flagged terrace on to a long bowling-green, which is surrounded by stone balustrades, with narrow flower beds as a border. A narrow flagged causeway goes round three sides of the bowling-green, affording at all times a dry footpath. The length of the bowling-green is 100 ft. by 35 ft. in width.

104'

Plate XC.

"HAZELWOOD", KING'S LANGLEY, HERTFORDSHIRE.

Architects: Messrs. Hubbard & Moore, FF.R.I.B.A.



Since the plans of "Hazelwood" were originally prepared, the flagged terrace has been constructed throughout the entire length of the southern front, with a return on the western flank round the conservatory (or palm-house). The eastern termination of this flagged terrace is formed by a semicircular alcove, with a half-domed roof above it. Around the half circle of the alcove high teak seats have been placed from which a fine view is obtained of the whole southern front and of the long terrace.

Advantage has been taken of the old-fashioned formal garden, which belonged to the house that originally stood close to the site where "Hazelwood" has now been erected, and the architects have set the North-west and South-east axis of the house coincident with the same axis of the formal garden. Both the effect of the garden and the house are enhanced by this axial treatment.

On the northern front a large octagonal court is being constructed, forming the carriage-sweep to the front entrance; and following the same axial line, a carriage drive is obtained to the roadway nearly a quarter of a mile distant. It is intended to erect large wrought-iron gates at the end of the drive next the roadway. By these means the old-fashioned effect of a Georgian house, with all its formal surroundings, will be carried out in this instance.

CHAPTER V.

ASPECT AND THE TREATMENT OF WINDOWS.

Although Aspect is of very great importance, its treatment need not, as a rule, prove difficult; and with due observance of the necessity of yielding on small counts, and of maintaining essentials, it is perhaps the least worrying of all the points (except Prospect) that have to be studied in the planning of a building.

In considering Aspect, it is a question of regulating the admission into any room of more or less sunshine; rarely is light *quâ* light the object of attention, and for the present at least the latter may be disregarded.

Everyone should know primarily that the motion of the Earth gives the effect of the sun rising in the East, proceeding southwards till noon, and setting in the West. And were this knowledge the utmost attainable, many defects in planning could be forgiven; but as it is possible to calculate for windows in all positions and throughout the day, there is but little excuse for excessive disregard of Aspect. Briefly stated, it is well known that

* On 21st Mar. (Spring Equinox),	the Sun rises at	6 A.M.	and sets at	6 P.M.
On 22nd June (Summer Solstice),	,,	3.45 A.M.	,,	8.15 P.M.
On 23rd Sept. (Autumn Equinox),	,,	6 A.M.	,,	6 P.M.
On 22nd Dec. (Winter Solstice),	,,	8.15 A.M.	,,	3.45 P.M.

If the mariner's compass is set out, and these positions are marked and noted as above, all the customary radials being set out, together with any required window, it will be possible to estimate the duration (in hours) of sunshine entering, if unimpeded by obstructions. So far distant is the sun from the earth, that to attain an approximately correct result, any desired window must be set centrally in the diagram, as can be readily understood. By this means it can be established, that taking a window of average size and set flat in a wall which faces, say—due North, there would be but a stray beam of early and late sun at the very height of summer. This might be considered welcome at the time, but in the winter such a window would produce very trying conditions in the total lack of warmth from the sun's rays, and more harm might accrue under the latter circumstances than there would be good effected by the summer coolness. This method of calculating the amount of sunshine is fully set forth by Professor Kerr in one of his books, and an explanatory diagram accompanies the text.*

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* These dates are approximate.

The maxim in regard to Aspect is :—Get all one wants out of the sun, and then give him his *congé*. This should certainly not prove a difficult procedure, as the principle exemplifies a well-known phase of human character.

It is natural to consider Aspect as gaining its chief importance in the planning of domestic buildings, though it must also be taken into account in certain other classes of buildings, and a systematic consideration of such of those as have been dealt with previously is advisable. But those only will be mentioned where Aspect is likely to affect in any way the scheme of planning.

Art Galleries.—These should by preference be North top-lighted ; but if any side windows are introduced, they should face East to North. Pictures cannot be properly seen when the sun is shining on them and at the same time casting the spectator's shadow on the object to be viewed.

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* The author a short time ago was seated in a bedroom with two southern windows set flat in the wall, and was interested to learn from the tenant that the sun entered the first thing in the morning, stayed all day and bid adieu only when it was time for him to sink below the horizon. As this was perfectly seriously said, and as there is no reason to assume reflected lighting as a medium, the speaker's lack of the humorous sense is obvious.

Art Schools.—The windows should face East to West *viâ* North in the class-rooms, so that nothing but diffused lighting may enter. A lecture theatre may have South-east windows, but anything more southerly should be avoided, as it would tend to make the room too hot in summer for comfortable use in the afternoon, and the soporific effects might indeed be pleasant but would not be profitable.

Assize and Law Courts.—The Courts may advantageously have a South-east aspect. Though for Breach-of-promise Courts principles for comfortable planning may be disregarded, yet in the Chancery Courts they are of very great importance, so that no further inducements to slumber should be offered, than are provided by the legal causes themselves ; therefore the quadrant from South to West must be strenuously avoided here. The Library,too, should avoid the quadrant South-west to North-west, for the reason that the books are easily affected by a damp situation.

Hospitals.—The wards are considered to be advantageously set when their longitudinal axes are North and South, so as to obtain East and West windows ; but though there cannot be two opinions as to the value of obtaining the early rays of the sun, there may well be disagreement as to the advisability of introducing the westering rays into the ward, as they would prove trying to many of the patients, and would necessitate the drawing of the blinds to mitigate the nuisance. But with ideas at present accepted, East aspect implies the simultaneous use of West for hospital wards ; and this is but another example of securing the greater benefit, as there is more good to be gained from having East windows than harm would accrue from having West. A day-room (which is for the reception of convalescents) should have the maximum of sunshine, as elsewhere noted ; a sun-bath is an excellent specific.

Houses.—As above hinted, it is in such buildings as these that Aspect assumes its greatest importance, for it is here that people desire the maximum of comfort; at any rate the majority do so, and legislation should be for the many and not for the few; it is in their homes that people look for the comforts of life, much more than in their business houses. Aspect is very largely a comfort provider; it is requisite to a great extent from a hygienic point of view, but it is more to be considered from the other standpoint. First consider the question of bedrooms; undoubtedly, East is the best position for windows, as by such means the earliest rays of the sun flood the room and lend a genial air sufficient to enable early risers to do their duty with some show of willingness, and, when it is time to retire to bed, the room is comfortably cool.

A Breakfast-room (which may often act as Morning-room) may be South-east advantageously, thus ensuring the early sun, and at the same time retaining it until about 11.0 A.M.

A Dining-room may well be provided with South-east windows, though if the room is intended to be used solely for the purposes of evening dinner, South to South-west windows would be acceptable. A Drawing-room may be South-east to South by West. A Kitchen can comfortably get on without any sunshine later than East. A Larder should face North for the maximum of coolness. A Study may be West if nothing else will serve, but by preference should be South-east; and as regards a Library, it should be limited to the quarter between North-east and South-east. The hot sun, which is injurious to the colours of book bindings, would be an objection in these rooms, and where the storage of books has to be considered as in a Library, West is inadmissible, as it would but tend to promote mildew. It can be readily conceded that the best study is effected by a gentle circulation of the blood, and that an excess of either heat or cold is detrimental; of the two, the former is the worse, and would but incline a student to yield to the charms of Morpheus, when a more wholesome influence might possibly have been embraced. A Wine-cellar should be free from any aspect whatsoever, as it is a mistake to subject wines to the influences of external atmospheric changes.

School-rooms should be South-east or South-west, as these aspects give efficient without excessive natural heat, and the westering sun would not be trying, except during a very brief portion of the year, as school hours usually conclude about 4.30 P.M. at the latest.

Billiards-rooms by preference should be top-lighted, and if receiving side-lights only, should have such lights on two sides, so that there may not be any direct shadows. Obviously, the windows should not be in walls facing South or West, if avoidable.

Offices.—Drawing-offices and such like are preferably provided with North light.

Shops.—Drapers', tailors', and similar shops are preferably treated for Aspect where the show-windows have a minimum of South sun on them, as the strong rays would serve to change the tones of the goods displayed. Frequently it is impossible to pay heed to this, but the principle holds good.

It might be noted at this place that means for correcting aspect exist in the provision of bay-windows, and this has a twofold benefit. They will (1) provide sunshine for a room where otherwise the outer face of the wall alone would receive it, and (2) exclude the sunshine where undesirable, *i.e.*, they will act negatively as regards exclusion, by providing canted lights, where otherwise the direct rays would be unavoidable.

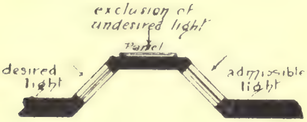

FIG. 24.—CORRECTION OF ASPECT.

There are also other means of getting the upper hand of Dame Nature; daylight reflectors and refractors hold an important position in the business relations of a crowded city; these aids may take the form of glass mirrors or glazed brick facings. Sometimes the lowly whitewash is also utilised, and though at first these details may not seem to have any connection with planning, yet indirectly they may serve to stifle qualms of conscience where an architect obtains some "desirable offices" in his plan, suffering from an insufficiency of daylight.

In connection with this subject, attention may be directed to a rotating house, designed and patented by MM. Pellegrin and Pètit, capable of boxing the compass, so that any room can receive any desired outlook at any period of the day ; the motive power is electricity ; but ingenious as M. Pètit's patent may be, the practical success of it may be reasonably doubted, more especially when the bedroom floors are considered with all the varying aspects obtained.

CHAPTER VI.

PRIVACY AND SECLUSION.

A little ingenuity will secure the necessary degree of Privacy or Seclusion under varying conditions, and these will now be considered.

A building (whatever its nature) may be excellently planned in other respects, but if it fails in this provision it is a deplorable error, unretrieved by its possibly numerous advantages. Privacy is of two kinds, as previously noted, viz., the privacy of one part from another, and of all parts from the public highways and byways. Both cases require the architect's earnest attention.

A note of warning may well be sounded here to guard against the hard-and-fast acceptance of any dictum ; the Principle is always to be accepted, but should be practised with discretion ; it is so easy to make a fetich of words, phrases, or formulæ ; these should not be considered so much for their own sake, as in the light of means to produce a desired end.

It is to be remembered that Privacy and Seclusion are not convertible terms. The average merchant may desire to ensure that his own office is private, but would highly object to it in a secluded spot. But in considering the disposition of a Study or Library, seclusion is very desirable, so that such a room may be out of the line of much-used domestic thoroughfares.

Privacy can be secured by means of various expedients—(1) By the mode of hanging the doors ; (2) by the provision of screens ; and (3) by disposing the various parts of any building in their proper correlation.

Consider primarily a room as shown in Fig. 25. The door, being hung to open as indicated in the room next the staircase, would (if left open) reveal the greater portion of the interior to any one entering or passing; but if hung as shown in the opposite room, the due amount of privacy is obtained.

A very obvious assumption at this place would be for the door to be placed centrally along the wall of the room. In such a case, a great deal would depend on the relative position of the window and fireplace; were the two confronted as shown in Fig. 26, the door would properly be hung as for A.

It is perhaps a moot point how the door should be hung in this room; but as the fireplace and window are not planned in proper correlation, it serves to show how one misdeed may be the cause of others. However, accepting this position of each of the three features as a necessity from some one cause or another, then it may well be remembered that it is better to screen the fireplace from observation than the windows. If the exclusion of draught is not greatly dwelt on here it is only because it is scarcely the right place for it, but it may be borne in mind that it is better to sacrifice some privacy (if necessary) in order to obviate a draught.

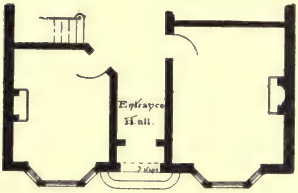

FIG. 25. — INCORRECT AND CORRECT DOOR-HANGING.

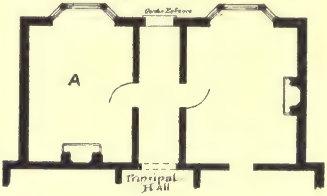

FIG. 26.—ADMISSIBLE AND CORRECT DOOR-HANGING.

There is an alternative mode of treatment of the above problem, but this solution is not always a desirable one, nor is it always possible, but under favourable circumstances it can be introduced effectively. This treatment consists in the provision of a small lobby either projecting into the room or the hall as shown in the sketches, Figs. 27 and 28. This not only secures the desired privacy, but lends an additional feature of interest to the room or hall, and it is a great desideratum in schemes to introduce "features" as far as possible, so long as they possess a *raison d'être.* In the instances shown they would not rise to the height of the main ceiling, but merely some 8 ft. or so.

If any people object (on the score of symmetry) to a door placed out of centre, they can balance an effective entrance with a sham, if conscience will permit it. Memory reverts to a house (in one of the Clubland squares) whose architect indulged in this symmetromania ; and verily the passion for symmetry was at one time much in evidence, viz., in the brave old days of Louis le Grand, euphemistically termed *Dieu-donné*, but (great sinner as he was, on the score of pseudo-symmetry) he might well have been termed *Dieu-abandonné.**

In regard to bedrooms, dressing-rooms, and bath-rooms, the bed, washstand and dressing-table, and the bath are respectively the objects to be primarily and effectively screened.

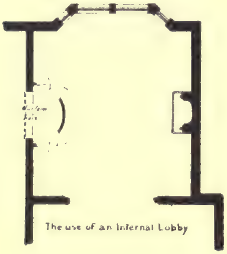

FIG. 27.
THE USE OF AN *Internal* LOBBY.

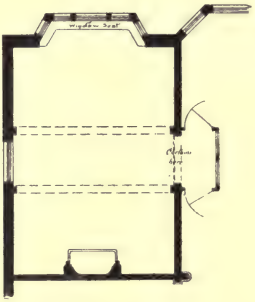

FIG. 28.
THE USE OF AN *External* LOBBY.

A case where privacy is easily obtained is where the inmates of a house are to be screened from the view of persons standing at the entrance-doors. The formation of a lobby is effectual, and though possibly resulting in the obstruction of some of the daylight, yet in a majority of cases there would be more to be gained by introducing than by omitting this feature.

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* M. Guadet remarks : "Symmetry is the regularity which may be taken in at a glance—intelligent regularity. Plans whose four quarters are absolutely interchangeable or superposable are not symmetrical, but nonsensical."

Where privacy is of supreme importance is with respect to sanitary conveniences, and it is a pity that this is so often neglected in the planning of houses. The carelessness exhibited is indeed so continuous as to amount to callousness.

What more common than to find the half-space landing of a staircase as the entrance to the W.C.? Such a position serves to secure the least possible privacy and is utterly to be condemned; but no! it is necessary perhaps to modify the above statement, though it is better not to erase it; the least possible privacy is where the closet is *immediately* entered from a living or reception room; this might be seen in London even in the last century, though doubtless before the birth of the London County Council.

One instance of this defect occurs in the town house built by Isaac Ware (A.D. 1749) for Lord Chesterfield; though this feature may have been removed when alterations were effected some years since.

At a meeting of the Architectural Association Discussion Section many years ago in connection with a paper on "Dodges," the provision of a W.C. (as in Fig. 29) was mentioned to the members. The passage shown gave entry to the garden, and yet was to be taken in as an integral part of the closet when the latter was to be used. An amusing instance, perhaps —certainly a curious one—but not to be repeated.

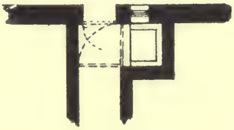

FIG. 29.

It is very often difficult to find just the right position, but that is scarcely an argument in favour of utilising the worst.

To explain this, consider such a house as shown in Fig. 30. This is an actual copy of the plan after which a terrace of London houses is built, and, whilst commanding a high rental, does not provide a proportionate amount of comfort as compensation. As an illustration, Fig. 31 shows an amended mode of planning this wing. The same outside dimensions of site are maintained for the purpose. The restricted size made it perhaps a difficult problem, but yet not an unsolvable one. By the amended treatment, too, some direct side-lighting would have been obtained for the staircase, which under existing circumstances is very deficient in that respect.

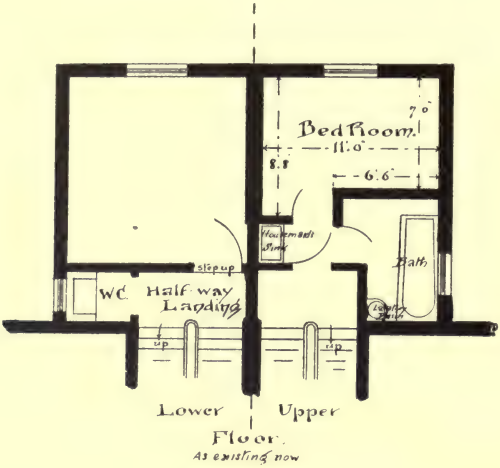

FIG. 30.—BAD POSITION OF W.C.

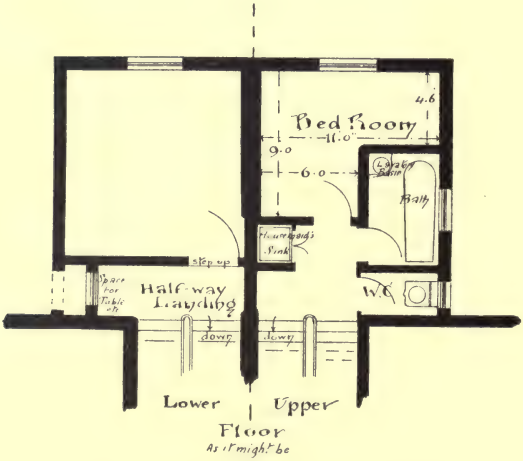

FIG. 31.--IMPROVED PLAN FOR FIG. 30.

Were it always possible, it would be very desirable to reach the W.C. through a cross-ventilated lobby, leading of course from a passage, not from a room. However, this is perhaps a luxury, reserved for hospitals, infirmaries, and other buildings supported generally by ratepayers.

Having mentioned instances of how not to plan these offices, it is only correct to give a contrasting example occurring in a number of terrace-houses built about forty years ago (see Fig. 32). The houses generally are almost as well planned as any of the size could be, and the one or two defects they possess are easily alterable.

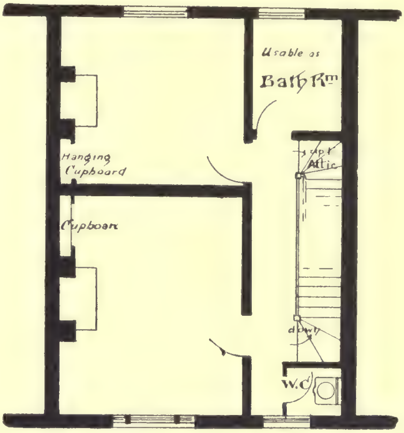

FIG. 32.—WELL-PLANNED BEDROOM FLOOR.

Privacy has also to be considered with regard to the relative position of one room (or set of rooms) to others. Thus the kitchen department should be kept well out of sight and smell of the living-rooms. There are different modes of effecting this.

(*a.*) The Kitchen and offices may form what is practically a distinct block, or (*b.*) they may be at least effectually screened off, as shown in the plans on Plate LXXXII. (the author has endeavoured to find out the name of the architect of the lower plan on that plate, but has not succeeded in so doing). (*c.*) Then again, in another scheme, the result would be attained by keeping all this department on a different floor from that utilised for the living-rooms, but this is not so desirable a method, as it is advisable to simplify to the utmost the service between the kitchen and dining-room (see later, under "Grouping").

Privacy has also to be considered in the relation of the Bathroom to others. It will be natural to treat the principal bedrooms most considerately in fixing the position of this office, but however and wherever planned, endeavour should be made to seclude it from the staircase. In important houses, additional bath-rooms should be provided, as noted earlier on page 98.*

Seclusion.—With regard to Seclusion, it is such rooms as a Study or a Library to which it would mainly be of advantage. Seclusion is, however, of still greater moment in buildings other than domestic. Thus in Banks, Government and Municipal offices, &c. &c. strong-rooms require this provision; and in police stations, where a detectives' room is provided, this should not face a street but an inner courtyard, as any chances of familiarising passers-by with the personality of the detectives should be deprecated. Until recently there were the regulation boots as a guide to those interested, but this does not come within the province of the architect. The cells also should be very secluded both for the sake of the public and the unfortunate occupants.

Another instance where seclusion should be considered is in the provision of caretaker's rooms in any building. The general public are not interested in the intrusion of such rooms in their midst, nor is it right to disregard the caretaker's claims for a proper provision of privacy—in this case, equivalent to seclusion.

In a large school building, the Principal has a great claim for due privacy and seclusion, and instances might be multiplied, but with very little benefit to the reader.

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* See also Plates LXXXVII. and LXXXIX.

CHAPTER VII.

ROOMINESS, FURNITURE REQUIREMENTS, AND PROSPECT.

IT may appear, on first consideration, as if it would be impossible to give to certain defined dimensions any appearance of greater capacity or any elasticity by structural means; and yet it is quite feasible, and serves to illustrate in extreme instances the difference between making the best and the worst of circumstances; truly it may be feasible to a small extent only, but where dimensions are restricted it is desirable to counteract the evil to the utmost. It is on a par with the mode of packing a trunk, that in the hands of a careless man will hold comparatively little, where an experienced traveller will pack his belongings so deftly as to cause surprise at the result.

> "And still they looked, and still the wonder grew
> That one small head could carry all he knew."

The sentiment conveyed in this couplet of Goldsmith's may become applicable to buildings when properly treated, as well as to crania.

Leaving the realms of analogy, some instances may be dealt with as illustrations of what it is purported to convey. Consider an example such as is shown in Fig. 33; for the purpose, it is supposed there is a passage in the position indicated; this provides an easy solution of the problem "how to make the best of poor conditions." Were the door to

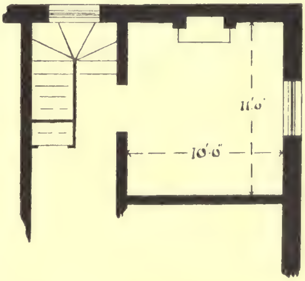


FIG. 33.—BAD POSITION OF DOORWAY.

be placed centrally, there would be about 4 ft. only on either hand, and this would be partially interfered with by the fireplace accessories, rendering about one-fifth of the room useless for seating purposes from this cause alone, and it is serious when the obstruction due elsewhere to furniture is remembered. If the door were placed as shown in Fig. 34, only one-ninth or one-tenth of the room is thus obstructed.

It is also an objection that has been raised against a centrally-placed door, that it is taking the place of some important piece of furniture, some picture, &c., which needs a central position. And it must be ever remembered that neither picture nor moveable ornament of any kind should be placed over doorways, as the sudden breaking of a picture-ring or a cord, or the falling of an ornament may injure someone entering or leaving the room; and the very fact of constantly shutting a door tends to weaken the support of anything placed overhead.

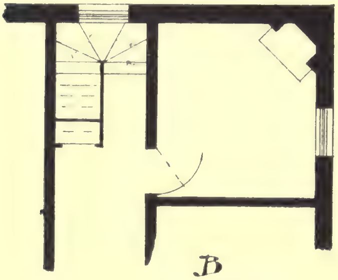


FIG. 34.—GOOD POSITION FOR DOOR.

Consider also the fireplace. In such a room the obstruction caused by the chimney-breast could well be dispensed with, and the requisite chimney space would preferably be provided either in a greater projection in the adjacent room, or (if the wall be an external one) by means of an external break. The window in a small room is better treated as a sash than a casement, except the latter open outwards.

Small rooms should also not be made inordinately high, as it but tends to produce a cavernous appearance. In a room of the dimensions just given, the height should not exceed about 8 ft. 6 in., otherwise the apparent size of the room is diminished. The object, therefore, in keeping small rooms of a low height is to cheat the eye, whilst the other points are for actually making the most of disadvantageous conditions.

Further, it is possible to make greater use of a restricted area in any room by hanging the door so as to open outwards, but this expedient is not to be indulged in lightly.

While on the subject of doors in relation to roominess, it is well to call attention to a too frequent error that occurs in plans; this is the concentration of doors, as shown in Fig. 35: here the door A could as easily have been placed at X, and the result would have been satisfactory. If this point is of importance in houses, it is even more to be considered in business premises. In the latter class it is to be noted that doors may advantageously be hung double, one leaf to open inwards and one outwards.

If in the furnishing of small rooms, people would but recognise the value of circularity as opposed to angularity, the benefit would be great. The subject of *Furniture requirements* has been discussed elsewhere under the heading of approximate dimensions, but it is well to write a little more about it.

Mankind often learns more *savoir faire* by failing at times to satisfy its demands than by casually succeeding. This has been proved sufficiently, to make prolonged comment needless. And though it is advisable to advocate the due consideration of furniture in planning a room, yet so seldom is this accorded and so often is the casual success above noted due to the excess of floor space unwittingly obtained, that it will probably be necessary for the majority of architects to suffer badly on some occasion before recognising the merits of this connection.

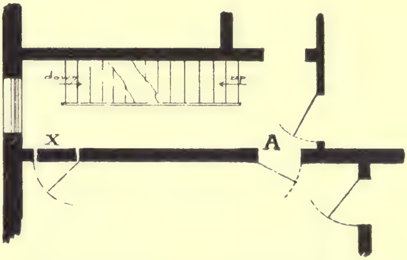


FIG. 35.—BAD ARRANGEMENT OF DOORS.

One instance brought to recollection by discussing this point is a house possessed of sufficient external charm. On entering, however, and endeavouring to arrange for the disposition of the furniture with a view to taking possession, there was found to be an utter disregard (on the part of those responsible for the planning) of the necessity of furnishing a house. Many of the rooms were absurdly small, even for the circular furniture advocated elsewhere, and where there were some of respectable dimensions, there was a superabundance of window area not to be tolerated, and rendering the satisfactory disposal of furniture a matter of great difficulty. Of course the house has found tenants on different occasions, but how they could live there is a mystery, and what the duration of their various occupancies, the writer knows not.

The root of the matter is, that an architect should not deem any point too trivial to claim his attention.

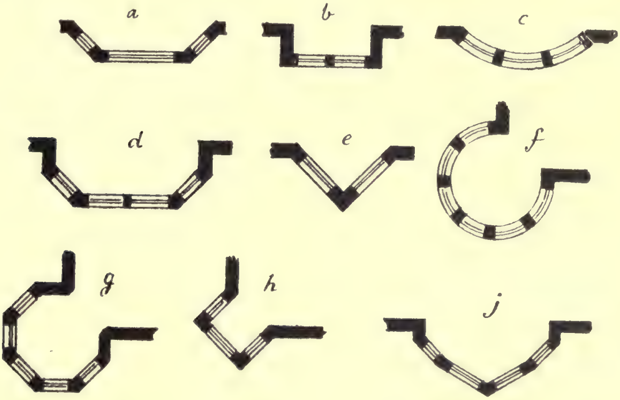
It has been previously noted that Drawing-rooms could not well be planned on the basis of furniture; and this of course is true, as it is difficult to do more than generalise as to the contents of such a room. People who are satisfied to inhabit very small houses frequently possess a grand piano of trapezial form, and provision may be needed for a settee or two, a dozen (or so) chairs, some cabinets and tables; it is, however, guesswork, unless a client specifies for what furniture his Drawing-room is to be built. With a Dining-room it is possible to deal; for in the process of arranging for an average number of diners, the treatment for furniture falls into line.

FIG. 36.

A Library has to provide room for book-shelves (preferably cased), a central table, some half-a-dozen chairs, &c.

Other rooms are sufficiently dealt with earlier, under the heading of approximate dimensions.

Prospect (by which term is understood both the revealment of some notable, pleasant, or redeeming feature, and also the concealment of some undesirable feature in a given outlook) may be described as a luxury for the wealthy and as a necessity for the less worldly favoured. It is generally accepted as an axiom that many a crime is traceable (indirectly it may be) to the protracted monotony of a dull and dismal outlook; outside influences form a powerful factor in human affairs, and ought to be reckoned with, and those people should be primarily considered, who are not strong enough to resist the effect of external influences, in preference to others who are less weak-minded among the children of men. It would not do, however, to sacrifice too much even for the sake of a good Prospect; but under ordinary circumstances it is possible to give due prominence to this requirement. Of course it can be well understood how valuable are projecting windows for the purpose of either revealment or concealment; for the latter purpose, the direct face of the bay would be blind, with windows in each end wall. The modes of treatment are numerous, and many of them are very effective both internally and externally; but one variety sometimes used is to be deprecated. Strictly it is not bay treatment, but has that effect, and at the same time it gives a weak appearance to the angle of the building, for which the neatness of treatment as regards the window itself does not adequately compensate (see Fig. 36). The satisfaction of Prospect may at times dictate the removal of some room to a higher floor than it would otherwise occupy, or perhaps it may call for turning the plan on its axis.



Various Plans of Windows.

FIG. 37.

Before quitting the subject of windows, a few illustrative forms (see Fig. 37) may be given. Of these, *a*, *b*, *c* and *d* admit of very pleasing adaptation; *e* is suitable only for the purpose of surveillance within buildings, such as libraries, hospitals, postal sorting-offices, &c.; *f* and *g* can be made highly agreeable features, both externally and internally, but it must be remembered that windows at angles tend to produce the *effect* of constructive weakness, and this, even though but a semblance, is to be deprecated; *h* is a poor variation of the last two kinds, and *j* should be condemned by all right-minded people.

CHAPTER VIII.

GROUPING, ETC.

Grouping consists in giving due proximity to parts, more or less intimately related. This demands serious attention, and not infrequently receives it successfully. Perhaps the reason is that it more feelingly appeals to both client and architect as members in common of the general public, that can appreciate the proper "grouping" of rooms or departments, where the due provision of other desiderata might be taken as a matter of course, or even where the lack of them might be unnoticed.

An architect may have calculated to a nicety the aspect of the various rooms; he may have secured due and fit privacy, pleasing seclusion, charming prospects, commodious rooms and pretty elevations, but these are not sufficient. The privacy, the aspect, the seclusion will be ignored. The prospects and elevations will be admired, the size of the rooms will call forth expressions of gratification; but if the grouping above referred to has been disregarded, vials of wrath will be poured upon the architect, and the benefits will be forgotten. It would be useless for him to say, that the plans had been approved by the client; therefore the better way is to avoid the error by timely consideration.

In a typical London terrace-house, the consideration of "grouping" is not possible; it is a case of dealing with various floors and with but two, or perhaps three, rooms on a floor.

The most elementary instance of grouping may be taken to be the relation between the Kitchen and the Dining-room. There are three objects to be considered here: (1) A short transit, so as to minimise the cooling of hot dishes; (2) the prevention of odorous communication between these two rooms;

and (3) the seclusion of service from the view of guests or callers.

Cases are numerous where (to obtain a short transit) the two rooms have been contiguous, and moreover have had a communicating dinner-hatch in the wall. Though the latter provides the shortest possible transit and gives seclusion of service to a great extent, yet it is to be deprecated entirely, as the communication of kitchen odours would be of a maximum intensity.

Cases also are numerous where, in order to prevent this trouble about odours, the two rooms are widely separated. This, too, is a bad expedient, promoting the lukewarmness in food, which is so objectionable, and the necessary reheating, which is considered almost equally unpleasant.

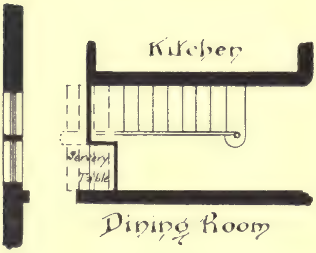


Fig. 38.

There is, however, a very simple expedient in houses where the two rooms are on the same floor; this is illustrated in various plans, and more specifically on the accompanying sketch, Fig. 38.

Where the Dining-room is on a different floor to the Kitchen, it is well to provide a small dinner-lift. There is not any objection to the latter opening into the Dining-room, provided it does not communicate at its origin direct with the Kitchen. All these minute points require attention at the hands of the designer, and so become a matter of habit, if cultivated carefully.

The position of the Servants' Sitting-room in relation to the main entrance is worth consideration: (*a*) it may obviate a protracted delay on the part of the caller, and (*b*) it may minimise the fatigue, that the servant would experience through frequent to-and-fro journeys. Where a footman is on duty by the entrance, this relational disposition is not of importance.

If the servants' approach to the entrance can be arranged, so as to avoid passage through the entrance-hall and principal stair enclosure, it is an improvement, more particularly when the Hall is treated as a Lounge. Some such arrangement as shown in Fig. 39 would be appreciated.

There should also be good intercommunication between the various Reception-rooms (this term is used here with the catholicity of house-agents' descriptions).*

In a house of any pretensions there should be a well-considered course between the Drawing and Dining rooms; there is not anything worse than unmeaning zigzag. It may not be possible, except in good-sized houses, to obtain a "processional," but a compromise can frequently be effected.

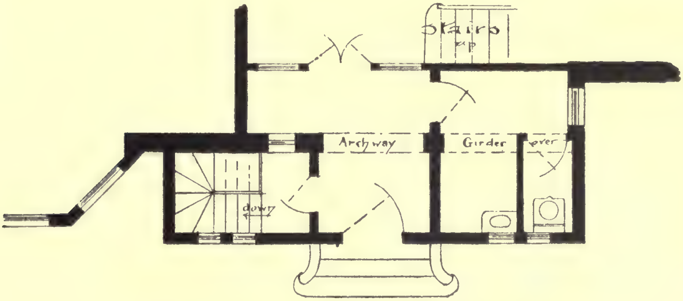


FIG. 39.—PLAN SHOWING SERVICE TO THE ENTRANCE, WITHOUT PASSING THROUGH THE HALL.

It may be accepted as an axiom that in dwelling-houses the doors of different rooms should not align; in suites of state reception-rooms it is another matter, but in private houses it only tends to destroy privacy and promote draught, and though ventilation is most essential, yet it must be provided in the right place.

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* A short extract from M. Guadet's book referred to elsewhere may be appropriately given here in free translation: Reception-rooms will be grouped; the large rooms forming a suite, the small ones being placed at either end; the latter, in fact, are suitable for confidential intercourse, card tables, &c., and provide a relative isolation in the midst of the neighbouring clamour, so that it would be wrong to place the small rooms between the larger reception-rooms to which they would then act as passages. A small room will be a natural link between the larger rooms on the one hand and the principal bedroom, library, work-room, &c., on the other hand.

Attention must also be called to the importance of keeping dinner odours from the Drawing-room. This is best effected by interposing a passage between the Drawing-room and Dining-room and the Kitchen.

Another point to remember is the proper relative position of the Bath-room or Bath-rooms to the various Bedrooms; destined to be used in common by the occupants of the latter, the bath-rooms should be disposed as far as may be possible with equal consideration for all. It is altogether different in scheming W.C.'s. Where bath-rooms may be equally visible to all bedrooms, W.C.'s should be if possible screened from all; that is to say, a degree of privacy is desirable for water-closets that would be quite unnecessary for bath-rooms. W.C. apparatus is not infrequently provided in the latter; but though desirable from the point of view of convenience, it is debateable on the score of hygiene.

It should be an endeavour on the part of architects so to dispose bath-rooms, lavatories, water-closets and housemaids' closets, that they are not situated immediately over the more important rooms and passages; for though accidents may not occur in the first ninety-nine cases out of a hundred, yet in the latter it would be well, that any mishap should take effect on the less important and more secluded part of the house.

Where there are two Water-closets provided for the family, one may advantageously be in conjunction with a cloak-room near the entrance, the other being placed on the principal bedroom-floor. The servants' Closet should not be in its customary close proximity to the larder or pantry, and it should be entered from the external air, not from the scullery (as is too often the case). Where servants of both sexes are kept, there should be separate closets, the men's being entirely secluded from the women's.

The Butler's Pantry should be in proximity to the Dining-room, and should be secluded from the general line of traffic, and from the trades entrance. It should be in easy communication with the wine and beer cellars. The Housekeeper's and Steward's rooms may be advantageously near the latter also.

So far the treatment of houses has been under consideration, but other classes of buildings provide for solution fresh problems of grouping.

In hospitals, workhouses, asylums, &c. the administrative department is best placed centrally, for economy of service.

In dealing with large *Municipal buildings* it is an elementary principle to keep each department practically self-contained; but there is a further consideration, viz., that the various departments must be properly correlated. The Town Clerk's offices should be near the Council-chamber, as there might during Council meetings be frequent references necessary to documents stored in his department. Committee-rooms may well be distributed through the building, so that one or other may be in close touch with the more important heads of departments.

Strong-rooms should by preference be grouped together in the basement, and it is as well that they should not be situated against external walls, so as to minimise the chances of a successful burglary. This arrangement secures at the same time the advantage of freeing more window space for other rooms. Staircases and lavatories should, on the other hand, be distributed over the building.

Where Municipal buildings are on a small scale (which is more frequently the case) the above points are much simplified. It is the principles, however, that must be grasped, and their application can then be adapted. It may be noted here (even at the risk of possible repetition) that in these buildings corridors are advantageous and should be of ample width. If any doubt exist as to making them wider or narrower in any particular case, the extra foot or so of width had better be supplied.

Law Courts and Police Courts require careful treatment in regard to grouping; the Court-house being the focus of administration, the private rooms of the chief functionaries should be close at hand, and Jury-rooms especially should be planned with a private passage into the Court, if not absolutely contiguous. Barristers' and witnesses' rooms (when provided) should also, if possible, be placed near the Court. Attention to all these points tends to make the difference between a thoroughly satisfactory and a mediocre scheme.

The communication between the day-cells and the Court should be private and secluded, and it is a good arrangement to bring the prisoner direct into the dock by stairs leading into the same, communicating with a passage beneath leading to the cells. This arrangement is indicated in plans given earlier.* When the general scheme does not permit of this, a private stair and passage should be provided ; this is the due of the unfortunate prisoners, to whom all possible consideration should be accorded on grounds both of justice and pity.

In spite of the preceding remarks, it must be borne in mind, that there is nothing worse than blind adhesion to the letter of any principle ; the spirit should be observed to the utmost, which is often quite compatible with giving *congé* to the letter. To take one instance : given a bedroom with two external walls, one easterly and facing a cemetery : the window should be inserted in the other wall, for the pleasant effect to be obtained from an east aspect would be more than counterbalanced by the incessant prospect of the "House of the Living" (as it is poetically described) ; it is a most perverse paradox that the feeling created by a constant view of man's last resting-place should be one of disquietude.

It is safe to assert that the principles of good planning will not, in any case, bear infinite extension. There is a well-known natural law in regard to elasticity, and these principles might suffer seriously, if the "elastic limit" were passed.

A few words may fitly conclude this chapter, in regard to the relative importance of the constituents, that unite in the provision of a satisfactory building of the domestic class, from the architectural standpoint. The order of merit may not answer in all cases, but in general it will certainly be correct.

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* See Plates III., LII., and LV.

Privacy is of the first importance, and in a majority of instances *Aspect* should hold second place, followed by *Furniture Requirements*, *Grouping*, *Prospect*, *Economy*, *Roominess*, and *Corridor Treatment*.

In regard to *Elevational treatment* a few remarks will be found later which should suffice to indicate the close connection that should exist between it and the planning (see Chapter XII.).

CHAPTER IX.

ACOUSTICS.

In this chapter there will be collected the views expressed by various writers on a subject which is admittedly under a perpetual cloud of dubious comprehension. Scientists may weave their fascinating discourses, the practical man may experiment, the faddist may indulge his fads; and yet, after a century (or more), the problem remains unsolved, though, it is to be hoped, not unsolvable.

Consequently, the assurance of good acoustic results is not yet obtainable; the "science" remains on an empirical basis, and has inspired one writer to utter the sentiment, that the improvement of the acoustical properties of a building must be determined by the ascertained defects, so that (in his view) no general rules can be laid down. Unsatisfactory as this seems, it contains more than a modicum of truth. How, for instance, can it be explained, that in the London Law Courts, different acoustical effects obtain in various Courts, which in *all* other respects agree harmoniously?

With the principles of the so-called science of acoustics (Gr. ἀκούειν = to hear) the present book is not greatly concerned, but a few general remarks on the subject will not be amiss.

When a phonic reflection returns at right angles, or, as Lord Rayleigh observes:* "When waves of sound impinge upon an obstacle, a portion of the motion is thrown back as an echo, and under cover of the obstacle, there is formed a sort of sound-shadow. In order, however, to produce shadows in anything like optical perfection, the dimensions of the intervening body must be considerable. The standard of comparison proper to the subject is the wave-length of the vibration; it requires almost as extreme conditions to produce *rays* in the case of sound, as it requires in Optics to avoid producing them. Still, sound-shadows thrown by hills or buildings are often tolerably complete."

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* "Theory of Sound."

In order that an echo shall be heard, it is necessary that the reflecting surface shall be at such a distance, that the *original* sound shall have ceased, before the *reflected* sound returns to the ear; otherwise there will be a blending, when the echo will not be perceived.

But, for practical purposes, an echo is not desired; consequently (as just hinted) in order to prevent its occurrence, the phonic reflection must be coincident with the original utterance. This may be effected by keeping the ceiling at a height that will expedite the echo adequately.

"It is important to prevent the repeated reflection of sound backwards and forwards along the length of a hall, intended for public speaking, and this may be accomplished by suitably placed oblique surfaces; in this way, the number of reflections in a given time is increased, and the undue prolongation of sound is checked."*

One effect of poor acoustical properties is, that the speaker is apt to experience the sensation of the voice not carrying properly; practised orators will commence their remarks with unimportant matter, so that, in testing the voice for "pitch," nothing that they really wish to be heard, will be lost in the preliminary vocal trial.

It is worth noting, that sometimes the presence of an audience is found to be adequate for allaying the reverberation, to which any given room may, when unfilled, be liable.

"In the absence of all deadening material, the prolongation of sound may be very considerable, of which, perhaps, the most striking example is that afforded by the Baptistery at Pisa, where the notes of the common chord sung consecutively may be heard ringing on together for many seconds."*

Passing reference may be made here to Whispering Galleries.

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* "Theory of Sound,"

Sir George Airy has ascribed the acoustical effect of that in St. Paul's Cathedral to a phonic reflection from the domical surface above; this, however, cannot be regarded as satisfactory and would not provide an explanation for the same effect at Gloucester Cathedral. Lord Rayleigh's observations led him to a different and a more logical conclusion; he noticed that the whisper is not heard merely at the point diametrically opposite (as Airy supposed), but that it creeps horizontally round the gallery, not necessarily along the shorter arc, but rather along that arc towards which the whisperer faces.

The question of acoustical treatment does not arise in small rooms, as the distance of the reflecting surface, in order to produce an echo, must be at least 45 ft. from the point of origin. It has indeed been claimed, that a monosyllabic echo requires at least 60 ft. of distance, and one that is polysyllabic, about twice that distance.

Acoustical defects are of a twofold nature, namely, echo and deadness; the latter is a form of voice-resistance and is said to be curable very often by means of improving the ventilating arrangements.

For the last time, M. Guadet may be quoted; but there has been no hesitation in referring to his "Eléments et Théories d'Architecture," as such a writer can but reflect lustre on anyone quoting from his writings. The following is a free translation: For Law Courts, the ceiling is an abiding tradition. Why is this? On account of the sound-properties. The old courts had wainscoted walls; suppose, moreover, similar treatment for a ceiling, and an absolutely sonorous enclosure is obtained. With vaulting, greater height is required. In churches, sound is indeed produced, but it reaches the congregation prolonged and reverberating. In order that a preacher may be distinctly heard, he must speak slowly, so that the vibratory waves of each word may have time to become still, before the arrival of the succeeding word. In a Court of Law it is different, where there is duologue—short, contradictory and perhaps excited speech; in such case, sharp and instantaneous acoustic properties are necessary, and experience assuredly shows, that the flat ceiling satisfies these requirements better than the vault; and this very consideration of acoustics is a sufficient reason for avoiding the use of projections and recesses.

Adieu, M. Guadet! But that last sentence utters a sentiment with which other writers are not invariably in accord.

The recommendation, that a room should be restricted in height is worthy consideration, as it may well be that the sound would linger in the upper portion, with a resulting reverberation.

It has been recommended, that in determining the proportions for large halls, a harmonic scale should be observed. For Concert Halls, the suggested scale is thus—height : width : length : : 2 : 3 : 4; for example, a hall 100 ft. long by 75 ft. wide by 50 ft. high would be proportioned harmonically; mere approximation has been regarded by some scientists as being worse than a total disregard. But that is open to question; indeed the alternative figure 5 is given for the length proportion (the example then reading as 125 ft. by 75 feet by 50 ft.).

For Lecture Halls the respective proportions recommended are height : width : length : : 2 : 4 : 3; and it has been pointed out that these proportions were observed in the admittedly satisfactory buildings—the Free Trade Hall at Manchester, and the Theatre of the Royal Institution. For the best results, it has been recommended that the audience should not be further removed from the speaker than 50 ft. in front, 30 ft. on either side, and 20 ft. in the rear (these dimensions are differently estimated, one writer advocating extreme distances of 92 ft. in front and 31 ft. in the rear, and another writer substituting 70 ft. for 50 ft.). The greatest number said to be in a position to hear the speaker is 2,000, arranged in two tiers. The end opposite the orchestra or speaker should be semicircular or rounded; the ceiling should be elliptical or coved and there should be a hollow space beneath the floor. The particulars just detailed would not, of course, be practicable in, say, a typical church, but may be with advantage borne in mind for consideration, when opportunity offers.

It will be desirable to collect, within brief compass, certain practical data (the results of experience)—on the one hand, for the satisfaction of acoustical requirements, and on the other hand, such as have been proved to be detrimental. To deal first with favourable points :—

Flank walls may be broken up superficially by means of piers and recesses, and a single span may be broken up into nave and aisles. Galleries—and more particularly a western gallery—may be recommended within limits ; undue projection, however, will render the seats underneath acoustically poor ; but though the use of galleries may be desirable for the body of the building, yet when an organ is installed over the western entrance (as is so often recommended), the side galleries prove detrimental to the proper distribution of the sound. Corners of apartments may be advisedly rounded or splayed. Wood is said to assist the good transmission of sound ; as also are copper wires, stretched taut across the apartment, either singly or else crossed diagonally in pairs. Though one writer scoffs at the idea of such wires being advantageous, declaring that such a device betrays absolute ignorance, yet the desirability of using them is generally admitted ; Lord Rayleigh maintains, in the book previously referred to,* that "a beam of wood or a metallic wire acts like a speaking-tube, conveying sounds to considerable distances with very little loss."—"These wires may be of steel, the ordinary piano wire of any gauge from No. 17 to No. 20 S.W.G. being suitable ; hooks are fixed at one end and tension screws at the other, for the purpose of adjusting the wires, which should be fixed not less than 8 ft. or more than 15 ft. from the floor level, according to circumstances ; the best height will be a matter of experiment, as also whether the wires should all be adjusted to one pitch. The proper mode of procedure will be to adjust the wires first to the pitch of the minister's intoning, and if that prove unsatisfactory, the wires should be attuned approximately to the various pitches used when reading, intoning, and preaching. It may be noted, that a sounding-board is often a necessary acoustical adjunct to a pulpit." * Cloth, hung in festoons round a building, has been found effective. The introduction of low open seats in place of high enclosed pews, the removal of hassocks in favour of kneeling-boards, and the substitution of tiles for matting, are all favourable for the preservation of the acoustical requirements.

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* "Theory of Sound,"

And this leads up to a few remarks as to unfavourable points in regard to acoustics: unduly lofty buildings, large unbroken surfaces to walls and ceilings, and any considerable unoccupied space. Plastered surfaces do not reflect sound satisfactorily, and a ceiling carried flat from wall to wall is better replaced by one that is arched, or by a ceiling that is flat in the middle with sloping, or else coved sides and ends. A very lofty roof, open from plate to ridge in one unbroken slope, is considered very bad, and may be improved by the introduction of a lightly panelled ceiling at the collar-beam level. The materials and fabrics common in churches, that soften and even deaden sound, are wool, cloth, hair, tow, matting, &c. Cushions, hassocks, curtains, people's dresses are all absorbents of sound.

And after all, the conclusion of the whole matter is: "Fiat experimentum in corpore vili."

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* Cassell's "Cyclopædia of Mechanics," edited by Paul N. Hasluck.

CHAPTER X.

STAIRCASES, INCLINED PLANES, AND MISCELLANEOUS FEATURES.

It cannot be contended, that the mode of staircase provision need form a guiding principle in the planning of interiors, though the total omission of this feature has, on sundry occasions, been a theme for scoffers, and not entirely without reason. Nevertheless, there is great merit in a well-planned staircase, and there is considerable misery in the tenancy of a building, where this feature has been treated perfunctorily.

That the staircase is the customary means, employed for intercommunication between the different floor levels, is natural; for though, considered singly, there may be easier or more economical media, yet this feature combines these two advantages.

In Assyrian and other dwellings of remote antiquity, inclined planes were not infrequently used, very much in the manner employed for modern storeyed-stables. There are points, favourable and otherwise, to inclined planes for domestic use. To dispose first of the advantages: slopes of easy gradient are preferable to stairs in buildings devoted to blind people; and similarly in places, where invalids in wheeled chairs desire to pass from one level to another. The blind develop a marvellous faculty for self-help and self-guidance in moving from post to post and from level to level; but the shock that ensues from the unexpected encounter against a possible obstacle, left on a flight of stairs by a heedless domestic, might cause an unpleasant spill, and this would be obviated by the use of an inclined plane.

The latter would be advantageous also in almshouses, infirmary pavilions and similar buildings—advantageous at least from some standpoints, even if the disadvantages about to be considered should outweigh the advantages.

It may be noted here, that in regulations issued by the London County Council, respecting theatres and other places for public entertainment, a demand is made for the use of inclined planes where possible, in preference to steps in corridors, &c., with the caution that the gradient shall not exceed 1 in 10.* With respect to the practical disadvantages accruing from the use of inclined planes, the following arguments must be carefully noted :—

In using steps, a rise of, say, 12 in. can be comfortably effected over a horizontal distance of 20 in. or even 18 in., equivalent to a rise of 1 in $1\frac{1}{2}$; this is beyond consideration for an inclined plane, though the author is acquainted with a subway gradient (in London) giving an incline of 1 in only $2\frac{1}{2}$ with very trying results. A gradient more pronounced than 1 in 4 should not be regarded as practicable in such cases; indeed, even that gradient is only to be taken as the limit, for its use would soon prove impracticable for a prolonged rise, such as is required between two floors; and in such a case, 1 in 6 should be the steepest gradient employed. Reduced, therefore, to practice, this implies that, treating an inclined plane on the dog-legged (or the return) plan, a horizontal distance of at least

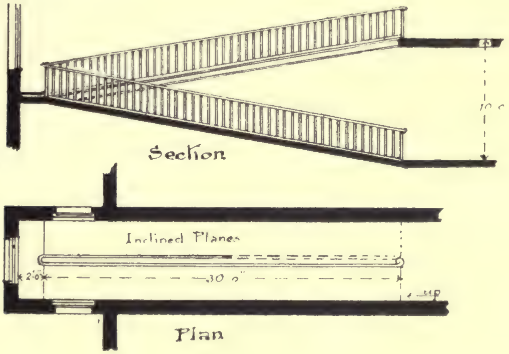

FIG. 40.

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* See Appendix B (Rule No. 11).

32 ft. would be necessary in order to effect a rise of 10 ft. from floor to floor; that is, a slope 30 ft. in horizontal length would rise 5 ft., a half-space landing at the half-way level should not be less than 2 ft. in width, and the *return slope* of 30 ft. horizontal length would span the remaining 5 ft. of height (see Fig. 40). The quantity of space occupied by this method could only be justified in a fair-sized building; and it must also be noted, that a height of 10 ft. as instanced, provides only for clearing rooms 9 ft. 6 in. high or less, an inadequate height in buildings of any importance or size; and furthermore, every 6 in. additional in height requires a horizontal distance of 3 ft. at a gradient of 1 in 6, or (on the dog-legged setting out) the horizontal distance would be 1 ft. 6 in. additional for each 6 in. of rise.

It is a further disadvantage, that even a gentle gradient is less restful than stairs, the foothold on the latter being always horizontal; and it is of course also disadvantageous to take so much longer time in getting from floor to floor by means of an inclined plane, as compared with stairs. Of course, a cat-ladder provides the shortest communication between two floors.

It will thus be seen that the balance of advantage is against the general use of inclined planes.

Primarily, a staircase should be adequately lighted, and this is better accomplished by providing a window in preference to a roof light, and the former method has the concurrent advantage of giving more efficient ventilation. If solely depended upon, a top-light is apt to produce an appearance of sombreness; in these isles, accustomed as their inhabitants are to frequent and ever more frequent rain, the weather should be borne in mind; for of all dreary sounds, the pattering of rain-drops upon glass is the most dreary; and this, in conjunction with the gloomy light, that would peer through the panes, necessitates alleviation by the use of side-lighting.

But a top-light may be beneficially used as an auxiliary, and may prove very effective if coloured glass be employed.

The mistake should be avoided of unduly cramping the width of any flight of stairs: two people should be able to stand abreast comfortably on any ordinary staircase; but this precept is more honoured in the breach than in the observance.

In certain cases, such as for turret or similar stairs, communicating with a library gallery, or for the use of bell-ringers, &c. the width need not exceed what is necessary for the passage of one person. On the other hand, staircases for important receptions or ceremonies should be of a minimum width to allow of the unrestricted passage of four people abreast, so that a lady escorted by a gentleman can pass in comfort a similar couple.

For ordinary stairs, a width of 3 ft. to 3 ft. 3 in. should be the minimum, and for state stairs, the minimum width would be 7 ft.

Stairs also should not start flush with, or too near to a salient angle or to a door, as this promotes unpleasant collisions; should a flight, however, be unavoidably near such an angle, the latter should be well rounded off.

It may easily arise, through want of due consideration, that an apparently satisfactory plan may prove faulty, with respect to "headway," when the sections are drawn, and this trouble may be avoided by the concurrent working of the plan and section, thus saving many an error that may otherwise await correction by some makeshift expedient.

The thought that has been expended on establishing the correct ratios of tread and riser, and that has been bequeathed to the profession, should be welcomed and freely used by the legacy-holders. There is not any advantage to be gained by needlessly trying experiments. In a house in the country, where the writer had to schedule and superintend repairs, a flight of stairs to the attic was constructed most absurdly with 10½ in. risers, 7 in. or 8 in. treads, and a width of staircase of not more than 18 in. (memory suggests that this was 14 in., but it may be left an open question). The client—a lady—was present at the time the survey was made, and in commencing the ascent of these stairs, which consisted largely of winding steps, there seemed to be reason to fear that they would be permanently blocked by her; but just at the moment when it was expected that a hatchet would have to be requisitioned for her excision, a quieter exit was effected. Risers 8 in. deep are not as uncommon as they should be. The customary dimensions are 11 in. treads and 6 in. risers, and this gives a satisfactory result. The Queen's staircase at Kensington Palace has 14 in. treads and 4½ in. risers, and though this is according to rule, it must be admitted that the effect when ascending is not very pleasing. The turret staircase to the Library of St. Paul's Cathedral has treads giving a central width of 1 ft. 3¼ in. with a height of 4 in., and the going is uncomfortable; fig. 44 gives a plan of this staircase. A markedly unequal proportion of tread and riser provides a better step ordinarily both in appearance and for comfort; a rough guide for proportioning gives a product of 66 in. as the result of multiplying tread and riser; tabulated, the nearest practical approximations to this product give—

Width of Tread, in inches -	8	9	10	11	12	13	14	15	16
Height between Treads, in inches - - - -	8¼	7¼	6½	6	5½	5	4¾	4½	4⅛

The moral of this table is, *never* to use 8 in. treads and to avoid as far as possible even 9 in. A width of 10 in. is the minimum for planting comfortably on the stairs the foot of the average adult.

Plan and artistic treatment being intimately associated in the designing of staircases, it is inadvisable to attempt to effect a divorcement. There are various forms of "case" or enclosure from which to make selection, such as oblong, square, polygonal, circular, oval, or a combination of these. A point for decision will be as to the provision (or otherwise) of a "well," *i.e.*, a central opening. Where rigid economy of space is not necessary, the use of a "geometrical" staircase (as one with a "well" is designated) is, in general, favoured by architects, by reason of its infinite possibilities in the way of design. In Fig. 41, a few methods of disposition are shown, but the possible variants on these and other methods militate against monotony.

Three important points to be borne in mind in regard to "well" stairs are (1) the hygienic value of the well from the standpoint of increased ventilation, (2) the greater difficulty created for efficiently and economically heating the staircase, and (3) the extra danger involved by providing an air-chamber, that, in case of an outbreak of fire, would seriously enhance the risks of spreading what might otherwise be but a slight conflagration. In a private house, of course, the perilous results to be feared are less than they would be in a densely-populated building.

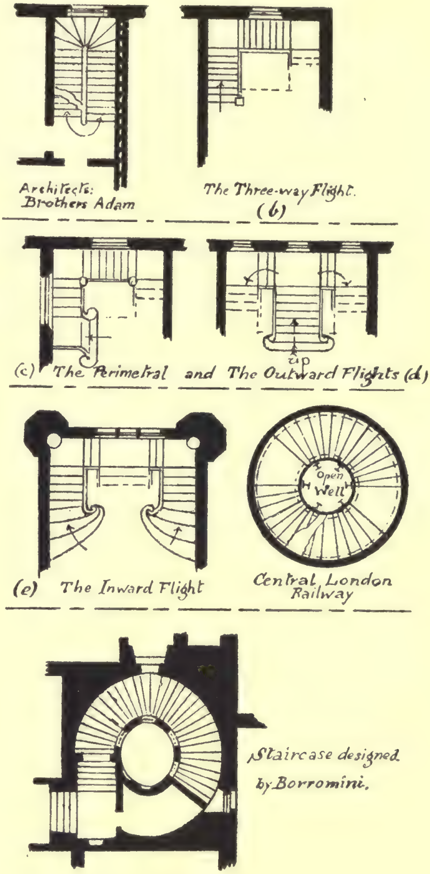
Architects: Brothers Adam
The Three-way Flight.
(b)
up
(c) The Perimetral and The Outward Flights (d)
Open Well
(e) The Inward Flight
Central London Railway
Staircase designed by Borromini.

FIG. 41.

The utility, as distinguished from the æsthetic possibilities of the geometrical staircase, is most apparent in the increase of lighting facilities afforded. The "well" also forms a good position for a lift; but bearing in mind the disadvantages above enumerated, its employment shows but doubtful wisdom.

This being so, it is well to turn to other dispositions, such as the *dog-legged*, the *straight* and the *newel* stairs. The first of these has the contiguous flights returning on their direct line of plane, as in Fig. 42; the "straight" variety has the steps built into walls at each end, and the flights follow but one right line of plane throughout. The newel-stair may be of the circular or the rectangular varieties, and the newels themselves may be either hollow or solid, or open in disposition; by the open-newel staircase is to be understood one composed of hanging steps let into newel-posts at intervals along the line of "well."

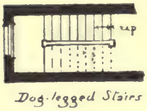

FIG. 42.

In a staircase with dividing flights [see Fig. 41 (*d*) and (*e*)] the central flight should be wider than either of the other two, though not as wide as their combined width.

In metropolitan theatres there is a preponderating use of the rectangular closed-newel stairs (see Fig. 43). It cannot be denied that the provision is a wise one, but it undoubtedly militates against the production of a pleasing staircase. Extra-metropolitan bye-laws not infrequently provide for similar treatment.

It has been noted earlier that the minimum "going" (*i.e.*, the *width* of tread) should be 10 in. for comfort; when, however, dealing with winding steps, or "winders" as they are habitually called, this dimension will be the *average* width of the step. At the narrowest point the "going" should not be less than 6 in.* The customary method is to set out the width of the winding steps along their forward axial line. "Dancing steps" are merely improved winders, being set out each independently of the others, instead of radiating from one centre, as in the case of the ordinary winders. But all these steps should be relegated to occasions when they cannot be avoided.

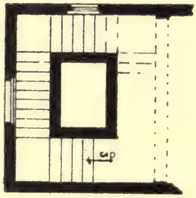

FIG. 43.

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* In the circular staircase in St. Paul's Cathedral mentioned earlier, the width of the tread ranges from 10 in. to 1 ft. 8½ in. (see Fig. 44).

It is desirable that the staircase should not face the entrance-door when it can be otherwise arranged—desirable merely from an æsthetic point of view in many cases; but in a house where there is only a single staircase, the desirability has an increased value, on the score of privacy.

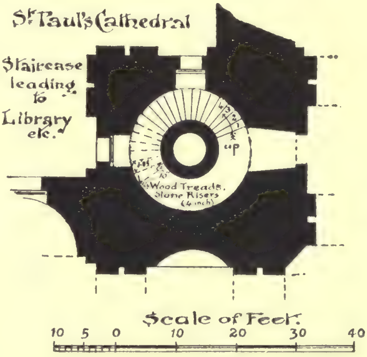
St. Paul's Cathedral
Staircase leading to Library etc.
1
2
3
4
up
Wood Treads, Stone Risers (4 inch)
Scale of Feet.
10
5
0
10
20
30
40

FIG. 44.

Though it is not the author's object in this book to enter much into detail, yet it may be advisable to make a few remarks in regard to the *ingle-nook*, a feature greatly in favour at the present day. Undoubtedly it has a pleasing appearance, but it has also its limitations; for example, it is an error of judgment to confine the *main* window-lights or the fireplace within the bounds of an ingle-nook; but for subsidiary lights, the treatment is quite permissible. The desirability of the unhampered movement of adequate light and heat in any apartment should not need insistence, but still it is too frequently the case, that matters mundane are arranged as they should not be, hence the necessity for these remarks. If the fireplace is set within an ingle-nook, it is less likely that the heat will fulfil its primary object—that is, to warm the whole room; and if such a nook has casements or sliding sashes, it is likely to prove draughty. Should a fireplace-nook be insisted upon, let the window-lights be fixed; it does not answer well that there should not be any special light at all, as this would render the fireside all but useless for reading purposes, except at the expense of affecting the eyesight. However, it is better to overcome any lurking desire to introduce such an ingle-nook; let it be relegated to the portfolio of faulty features. And similarly with respect to *main* window-lights. For the purposes of a cosy corner, however, an ingle-nook has every recommendation, but in order to justify its character, it should be decidedly cosy; if situated S.E. to N.W., as in Fig. 45 (*a*), the windows should be as there shown, thus introducing the S.E. sun and giving also a N.W. window; by this means, the sun is debarred entrance during its most trying heat, and the window seats being fitted as shown, sufficiently indicate the architect's recognition of the objection to sitting directly facing the window. If the position of the ingle-nook were as at (*b*), then windows could, as regards sunlight, be introduced on all sides, if desired, but it would be preferable to have the canted sides as solid walling, an excess of light interfering with the character of cosiness.

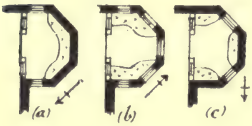

FIG. 45.

To fenestrate an ingle-nook with the compass-points as shown at (*c*), the two canted sides alone should have windows and the seating might be as shown; a direct West window in such a nook is inadmissible in the principal position, and though S.W. is not desirable, it is yet preferable to direct South, either in summer or winter.

The three examples given will suffice here in regard to detailed explanation, but below in Fig. 46 are shown the fenestration and seating for a similar ingle-nook with the compass in the remaining cardinal positions; a five-sided nook has been used for illustration, as being typically diagrammatic. The window-seating is not a fixed quantity, the main point to be remembered having been stated above.

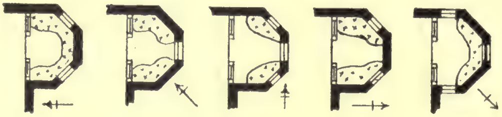

FIG. 46.

Lockers are a too frequent provision in connection with fixed seats; for, if utilised, it may well happen that people, using the seats, will be disturbed for the purpose of a visit being made to the lockers. If, however, the latter are provided, they should have sliding doors in preference to top flaps, so as to minimise disturbance.

If seats are provided in wide window-bays, and columns are required in the opening to aid in carrying the bressummer or girder over, these columns should preferably be arranged as in (*a*) and not as (*b*), Fig. 47.

In connection with window-seats, it may be noted that it is well to avoid carrying them the whole length, more particularly where the recess is shallow, as space for an "occasional table" or possibly for a fixed, or a flap, shelf should be provided; all such trifling aids for comfortable enjoyment are very desirable provisions.

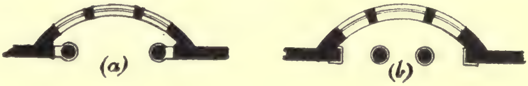

FIG. 47.

A few notes on lifts will be in place here, but the treatment will not be, by any means, exhaustive.

The advantages, accruing to the occupiers of a dwelling-house from the possession of a service-lift, cannot be overrated. The saving in labour for purposes of conveying fuel, whether for external or internal consumption, when the domestic offices are on a different floor to the living-rooms, renders the attendant initial expense a justifiable one, even if there be not any actual recoupment in money.

The average space, too, required for a coal-lift or a dinner-lift is not such as to render it a matter of difficulty to find the necessary room; for all ordinary purposes, a cage not exceeding 2 ft. by 2 ft. suffices, the well-hole (as it is called) giving an average allowance of some 3 in. to 6 in. working space around the cage. Some stock sizes may be useful:—

		Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Cage.	Width -	1	3	1	6	1	9	2	0	2	0	2	3	2	6
	Depth -	1	0	1	3	1	6	1	6	1	9	1	9	2	0
Well-hole.	Width -	1	10	2	1	2	3	2	7	2	7	2	10	3	2
	Depth -	1	5	1	8	1	9	1	11	1	11	2	2	2	6

These are sizes of "single-cage" lifts, "double-cage" requiring rather more than double the width. At the back of the lift, as a rule, less space is required than at the sides, where the gearing, &c., is customarily arranged. But details of that nature do not greatly concern the architect.

Service-lifts of this nature not requiring skilled attention, it is a matter of wonder that their use is not more general. It is different with passenger-lifts, but these are not customarily introduced into private dwelling-houses, nor does there seem any reason why they should be, except where there are several storeys in the dwelling. But a luggage-lift in a private house is very desirable, 4 ft. by 3 ft. being a good average size for the cage, though, in this case, a skilled attendant would be necessary.

For blocks of office-buildings, warehouses and indeed for business premises generally, passenger and goods lifts are in great demand, the "well" of the staircase in a large number of instances being utilised for the passenger-lift. This has its advantages and disadvantages. If there should be delay in the appearance of the cage, time is then saved by the immediate use of the stairs, and this is an important matter during business hours. But a disadvantage of some import is the draught-shaft provided by the open well-hole, which in a case of fire has often led to disastrous consequences.

In hospitals, specially large lifts are often provided for the transference of bed-ridden invalids from floor to floor, on occasions when an operation may have been necessary.

In carriage and piano factories and depôts, large and specially strong lifts are necessary. Many other instances might be noted, but the particular requirements must be considered in each case. The arrangement and disposition of passenger-lifts in the Imperial Institute, London, is particularly neat; Mr T. E. Collcutt is the architect.

With regard to an *Entrance-porch*, it may be urged in its favour that it provides a temporary shelter for those awaiting entry into the house; this is appreciated whatever the season of the year. An additional advantage exists by reason of its serving to break up the elevation, and thus add to the effect legitimately obtainable.

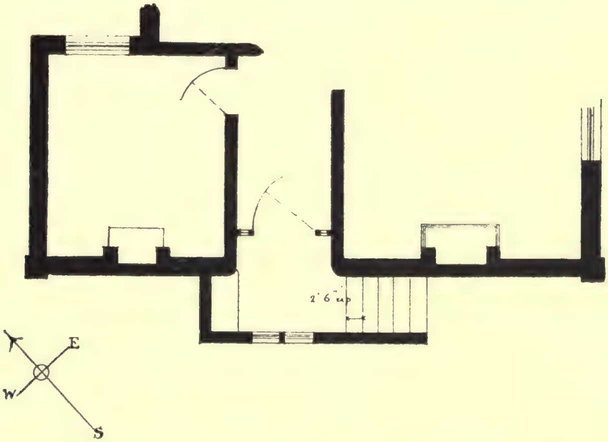

Fig. 48.—The Use of a Porch as a Weather-Screen.

Porches have a further advantage, and one not to be despised, for they can correct the Aspect most effectually, as well as help to screen the entrance-hall from inclement conditions of the weather.

In the sketch shown in Fig. 48 it will be evident that the hall is screened from the blusterous south-west gales by the introduction of the porch shown.

The Entrance is frequently disposed on a different side of the house from that utilised for the principal rooms, in order the more effectively to secure the privacy of the latter ; there is something to be said in favour of this planning, both on the score of æsthetic and practical grounds.

It is well, where it can be afforded, to provide a *Conservatory* attached to the Drawing-room. Even if it be only a small one, it forms an interesting feature, a pleasant exit to the garden, and it will act as a natural means of ventilation to the drawing-room. The floor should be kept about 2 in. at least lower in level, the gangways should be about 2 ft. 6 in. in width, and the longitudinal axis by preference should be North and South.

FITTINGS.

The few remarks to be made under this head may include references to items usually known as fixtures; but as there is not any legal question involved, the latter term may be disregarded for the purpose.

It is well to avoid the vasty and nasty wooden enclosures to fittings, which were so common a feature for the greater portion of the nineteenth century. The growing belief in their insanitary qualities is to be commended, and fortunately it is becoming a matter of course, that they should be omitted.

Baths, lavatory suites, W.C. apparatus and sinks of all kinds should be left unenclosed; and there are such large capabilities of selection from those put on the market, that every taste and requirement should be enabled to find satisfaction.

The floors of rooms should be unencumbered by heavy furniture, which cannot be moved without difficulty; or if such articles are favoured, they should stand on legs at least 9 in. high. If this point is attended to, there will not necessarily be any accumulations of dust and flue, which are not only objectionable but also insanitary.

The desirability of utilising the angles of rooms has been recognised to a slight extent and will bear further recognition. Angle sinks and angle lavatory-basins (more especially the latter) might be advantageously adopted to a much greater extent than at present. At times, also, angle W.C. fittings may be used, though usually there is little to be gained by it; there is not any reason to be urged against the adoption of bracket W.C. apparatus generally. At present, its use seems to be confined to a few hospitals; where the valve system is desired, such fittings are at present impossible, as they do not exist in this form. The employment of this system does not necessarily involve the use of a wooden enclosure, as a "pedestal-valve" apparatus is on the market, which obviates the the use of the objectionable feature.

In planning houses, the provision of cupboards is often neglected. For a considerable period these useful adjuncts went out of fashion apparently, but of late years they have become the object of ever increasing favour; and the house shown on Plate LXXXV. is a favourable example of the supply of cupboard accommodation. When it is remembered that their provision can be ensured without entailing any considerable loss of space or expenditure of money, the wonder is that so many houses have been left unprovided in this respect. The narrowest space need scarcely be despised for the purpose; underneath flights of stairs and in recesses formed by chimney-breasts, &c., cupboards work in admirably. Blocks of offices also benefit by the provision of cupboards, which (perhaps somewhat paradoxically) seem to give room, instead of occupying it. Corner cupboards, it may be noted, form a pleasing feature, giving the desired accommodation in a living room and at the same time taking off the crude effect of the angles.

CHAPTER XI.

ECONOMY.

Under this heading it is intended to dwell on the increased difficulties, that an Architect experiences when freedom of scheming is curtailed for the sake of lessening the expenditure.

The exercise of Economy leads to makeshifts—some unavoidable, it is true; but in many cases the employment of ingenuity will overcome apparent obstacles.

Broadly considered it should not affect the application of vital principles, even if £500 be the substituted expenditure for £5,000; it may result in decreased accommodation and cheaper materials, in less luxurious decorations internally and less ornate elevations externally, but it should not affect, except to a minor extent, the satisfactory consideration of the broad principles of planning. The object, therefore, is to discover the limits of permissible alterations on the score of economy.

As regards furniture requirements, the irreducibly correct minimum *size* of any piece should not be lessened, even from the standpoint of economy; but it is frequently possible and permissible to plan a room or an office for a diminished *number* of articles. A Dining-room may provide for fewer diners; a Drawing-room may be relieved of the odds and ends of cabinets, tables and chairs, that take up so much space and that may well be dispensed with under the circumstances.

Bay-windows may be omitted except where their provision is for correction of Aspect, and similarly with porches, lobbies, and vestibules; *i.e.*, "features" (as such) may be omitted where economy is a necessary consideration.

In the Kitchen, the size of the dresser may be reduced; the

Scullery and the larder may be made smaller than *absolute* convenience would dictate.

Stairs may be diminished in width and have steeper risers, and may also have "winder" steps, so as to take up less space; and the size of passages and halls may be reduced. Cupboards also may be omitted, though this would be regrettable.

The word "may" is used advisedly, as in many cases *all* these drastic measures for economy would not be necessary, and the architect could make his own selection; and it must be remembered that the subject is being dealt with here only as respects the possible effects on planning.

Economy should not have an evil effect on the grouping or Aspect. Indeed it may frequently result in a compact plan being produced, where otherwise a straggling, badly-knit scheme would have seen the light. The plan of a large private house is brought to mind, where it seemed a day's journey from the Kitchen to the Dining-room, without any intermediate servery being shown and the food as a result could not but cool in transit. A more compact plan could have obviated this. "Prospect" must be regarded as a possible sacrifice under circumstances such as are now being considered.

The chimneys placed against internal walls and grouped together will prove economical, and at the same time increase the general warmth of a house during the firing season. In smaller houses, a pleasing effect is at times obtained by bringing all the flues together into one central chimney stack above the roof.

One mode of treatment, where plans powerfully affect this subject, is the introduction or avoidance of irregular angles. For example, where economy has to be given heed to in a house, an octagonal or hexagonal hall would not be used, nor would angle fireplaces. By this means a fruitful source of increased expenditure is avoided.

Another point to bear in mind is that, in like circumstances, if dealing with a site that has a rapid slope, the plans would be accommodated to the latter, where otherwise, money being no object, the ground might be brought to a level to suit the plans. The latter arrangement entirely precludes the exercise of any ingenuity, so that although from an artistic standpoint it may be desirable, it diminishes the professional value of the building.

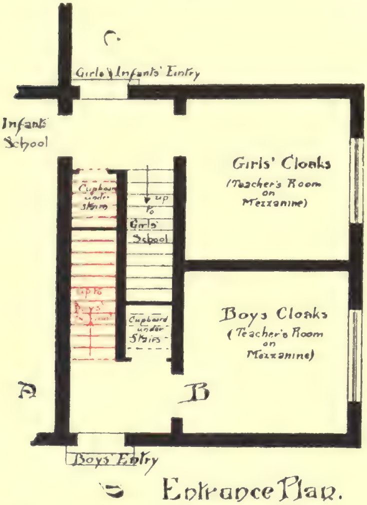

Fig. 49.—Combined Girls' and Boys' Staircase for an Elementary School.

As regard Elementary schools, for example, such a case is recalled where the tremendous slope in a country site was proposed to be utilised in the provision of the boys' covered play-ground, and in addition for giving entry to the boys' staircase, by which means an ingenious arrangement of getting the girls' and boys' staircases in the same compass of walls was obtained. The sketches in Figs. 49 and 50 show an arrangement of staircase on the above lines, originated by a former architect to the London School Board many years since. This system is

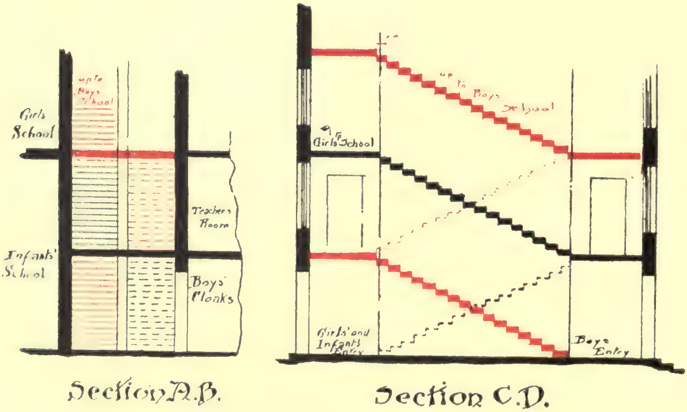

Fig. 50.—Sections of Staircase shown on Fig. 49.

found in the Château de Chambord in circular and artistic form.

It may be thought that too much is often written on the subject of symmetry, so at this point it will be briefly noted that such treatment is difficult to *ensure* in private buildings, when economy is a consideration, and similarly with what may well be termed "sham planning" of all kinds. This, though, would not be the case with such buildings as artisans' dwellings, Elementary schools, workhouses, &c., where at least a quasi-symmetrical exterior would be likely to produce the most economical result.

CHAPTER XII.

PLANNING IN RELATION TO THE ELEVATIONS.

It has been elsewhere remarked that plans and elevations should be considered concurrently, as a better result is likely to accrue by this means. A plan may be correct in every particular and yet produce a most uninteresting elevation.

Were there only two alternative selections, viz., a good plan and inartistic elevation, or a pretty building with a poor plan, there should not be any hesitation in making choice. However, plan and elevation can, with a little trouble and permissible compromise, usually be more or less effectively combined; and if, for simplification, the item of expense be disregarded here, there are boundless possibilities in the way of obtaining a good appearance externally for a well-devised plan. And remarks that apply forcibly to the exterior are also applicable, in a lesser degree, to internal decorative treatment.

It must not be regarded as a question merely of symmetry or ametry. The former is not indispensable, though often desirable; and to court shams and inconvenience, as is so frequently done, in order to obtain a symmetrical building, is a grievous fault. Some disputants urge in this connection the *argumentum ad personam*, remarking that human beings (and indeed most animal objects) show a symmetrical front; but in that very argument lies their defeat, as it is patent that a vertical central line being taken, the functions of the members are for the most part similar right and left of this central line, whereas in most buildings the case is reversed.

In museums, Council schools, &c. symmetry can be introduced most effectively and righteously; and a large portion of the delight, with which most people view the Natural History

Museum Buildings at South Kensington* is traceable to the fact that the exterior elevation emphasises the plan. Balance is a quality that must always be present, nor will grace of detail condone its absence.

A simple illustration drawn from nature will give point to this contention. If the giraffe and gazelle be contrasted, it may be noted that neither beauty nor refinement are lacking in either, yet the result in the one case is unpleasing, indicating a distinct want of balance of parts in the giraffe, whilst the gazelle is a perfect and harmonious object of nature.

It is indeed only by means of the architect's earnest attention to all matters big and little, artistic and technical, that a thoroughly satisfactory result can be attained.

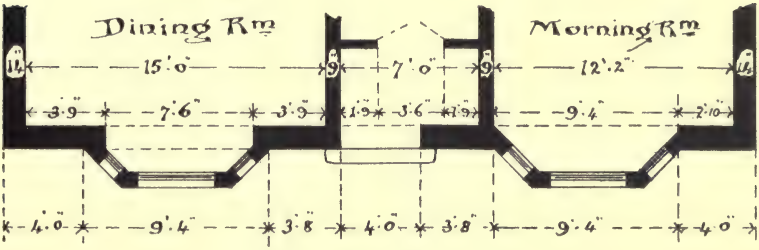

FIG. 51.—SETTING OUT A SYMMETRICAL FAÇADE.

After airing principles in the manner just set forth, it will be well to give more specific directions of the way to act in practice; and primarily it must be remembered that even as it is an error to sacrifice unduly to the idol called symmetry, so also is it wrong to neglect it wilfully. In dealing with a plan and façade as indicated on the sketch shown in Fig. 51 (and this type is of common occurrence), the bay-windows may advantageously be dealt with more or less symmetrically. Thus the first consideration would be the Dining-room; it would be natural, after deciding on the width for the window, to place it centrally along the wall; this would be the keynote, to which all the rest would be tuned. It will be noted that the final effect of symmetry is external, and this is as it should be, as the whole façade can be focussed in one view, whereas the interior cannot be taken in visually from one standpoint. Again, externally the symmetry is set out, in this case from the angles of the façade, for with the given dimensions and the given treatment of the Dining-room as the basis, the planning, if set out from the centre line, would make the Morning-room angle weak in effect. Otherwise it is better to work as much as possible from central lines. The Morning-room can dispense with symmetry, and indeed is the better for its absence, gaining thereby in increased freedom from formality.

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* For a plan of the Natural History Museum see Plate LVII.

Another example may be taken, which will be adequately illustrated by the sketch shown in Fig. 52. There are some who would not hesitate to instal a bay-window in the cloak-room, similar to that in the Drawing-room, nor would they feel any qualms of conscience. The correct mode is to recognise frankly the propriety of treating each room as a separate unit; it is an excess of pseudo-sentiment to consider it necessary to mask these offices. However, to meet the views of those who yearn for a symmetrical elevation, it might be possible to shift the position of the cloak-room and its adjuncts altogether, and to substitute a reception-room.

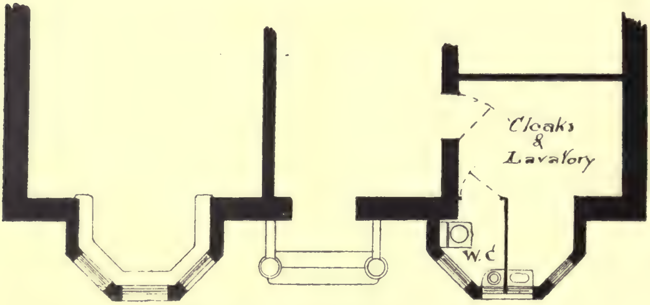

Fig. 52.—An Example of Culpable Symmetry in a Façade.

It will not be amiss to mention here a mechanical aid to planning, brought to the writer's notice many years ago, and to be found dealt with by the late Professor Kerr in one of his books. It has distinct merits of its own, that should recommend it favourably.

Having settled on the approximate superficial dimensions of the various rooms, separate pieces of cardboard are cut to a uniform scale and representing the different apartments ; there are also pieces to represent staircases, passages, &c. The architect is thus enabled to twist and turn the whole of the pieces about, and get a quicker grasp of possibilities and a better notion of the desirable treatment of the scheme, than by indefinite plottings on paper, where indiarubber is not unlikely to play a prominent rôle. Some readers may recall the method of one architect, who schemed each floor of a building as a complete unit, subsequently making the necessary mutual concessions and adaptations as between the several floors. A very clever designer may perhaps avail himself of this method, but it is not to be recommended for general use.

Intimate as should be the relation between plan and elevation, it will be found that, in a majority of cases, the best design results from giving full effect to the true lines of the plan, if the latter is well considered. Look after the plans, in short, and with comparative facility the main lines of the elevation will look after themselves. The ancients produced buildings that are admired to-day, the feeling doubtless being largely due to the sincerity, the frankness exhibited and emphasised ; this may be unconsciously the source of our delight, but so intimately do truth and beauty act and react on each other, that it may well be difficult to ascribe feelings to their rightful source. When, however, a thoroughly satisfactory building is noted, the most should be made of it, as, by studying it, the chances of evolving further equally notable buildings are largely increased.

Before bringing this book to a conclusion, it may be well to deal briefly with sundry points, to which but slight attention has hitherto been devoted. It has been urged by some critics (whose interest in the subject-matter of this work is as keen as the author's) that amongst the principles should be included the following:—Axiality, mass, proportion, focus and the beauty of line in plan—in one word, Planæsthesia.

Those people, whose views are voiced by the critics mentioned above, should remember that the lines of the plan are merely means to an end. Beauty of plan exists merely on paper, so far as buildings are concerned, and in the process of transference from the draught to the embodiment, the *lines* of the plan lose their significance as an element of beauty as they become merged in those of the elevation. It is in the raised structure, that beauty, as a factor of design, plays a part, and one, it must be remembered, of great import.

The pleasure afforded by an "æsthetic plan" begins and ends with its appearance on paper. To perpetuate it, it would be necessary to invoke the services of an aviator, whose airship would require to be poised directly over the building to be viewed, and at a sufficient height to focus the whole and to obtain the effect of mass as opposed to detail. Indeed, to carry the argument to its logical conclusion, in order to obtain an effect similar to that afforded by the draughtsman's *typical* plan, it would be necessary to slice away the roofing, to blacken all sectional walling, and limewhite all floors and finished surfaces.

It is a matter of wonder to the author, that this want of value of planæsthesia, in regard to *buildings*, is ever questioned. When, however, *landscape gardening* or *decoration* is under consideration, then planning is, to a great extent, both means and end; and, as a result, the æsthetics of line and form require every attention.

On the same plane of argument lies the consideration of axiality, proportion, &c., in relation to plan. So far as any *æsthetic* value is attachable to one or more of these points, they are merely principles of design in relation to elevation. Respecting axiality, however, to the extent only that its value can be demonstrated as providing in some case the easiest, most practical communication between different rooms or between different blocks of building, does it possess a value in planning.

It will be seen in the notes at the end of Chapter IV., respecting Messrs Hubbard & Moore's plans of "Hazelwood" (see Plate XC.) that the merits of axiality are referred to; but the value in that instance is in no sense practical, and its artistic value arises from the relational bearing of the house and the landscape gardening. It cannot be too strictly insisted upon, that axiality in domestic architecture, as regards internal planning, is to be avoided rather than favoured; for whilst economy of service should be a feature of planning, the stiffness of formality is undesirable, except where the architectural type or conditions require it. In this connection, it may be noted, that, where there is a sudden and violent change of axial direction producing an unpleasant effect artistically, this can be overcome by the interposition of a circus at the axial junction, as shown in Fig. 53.

The value of axiality is, however, in evidence, where town planning is concerned—a practical value, be it noted. The various garden-suburb plans look well enough on paper and possibly viewed aerially, but there the *artistic* value of axial treatment ends. Focus, however, has both a practical and an artistic value, though its merits have not received justice to any notable extent at the hands of English municipalities. But neither practically nor artistically is it desirable to provide focal points of insignificance. The "Place" and its compeers are admirable if the chief public buildings are there congregated, and if important thoroughfares converge from many directions. But even in such planning, no senseless chill symmetry is called for.

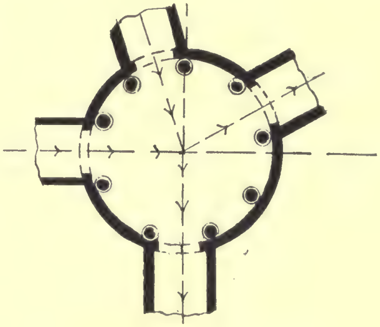

FIG. 53.

This leads to the consideration of symmetry in plan. The author has been placed in the unfortunate position (possibly through want of perspicuity on his own part) of appearing to despise symmetry. This is far from being the fact; but it is quite true that his enthusiasm for this quality of design is restricted to the lines of elevational design, except in those cases where the required accommodation lends itself naturally to a symmetrical disposition.

On this point also there is a great deal of misapprehension. The so-called "Gothic" type of plan is frequently unfavourably contrasted with the demure lines of the Classic type. But in the case of a dwelling-house, at any rate, the chances are all in favour of a more suitably-disposed building in detail being provided by the former than by the latter type. When architects bear in mind the very different requirements in accommodation, in aspect, in relative position, in seclusion, or in privacy, demanded by the various rooms that unite to form a dwelling-house, can it be seriously doubted that licence and not restraint of plan is the desideratum?

The nineteenth century of the Christian era was not entirely devoid of buildings worthy to rank with the *chefs d'œuvre* of the ancients; and were it possible to pierce the mists of futurity, glimpses would be obtainable of pilgrimages to these latter-day shrines similar to those now in vogue with regard to *our* ancient buildings. In order, however, to form one of that small company of architects whose life, works and influence will form part of the curriculum for future students, it will be necessary to give substantial heed to the signal merits of truthful design. Nor does this interfere with the use of adornments of all kinds, but necessitates their appropriation and selection on well-defined lines; they are not well adapted for cloaking errors, but have a distinct value for emphasising details and outlines. What more natural, if the form of roofing justifies it, than to deck it with a more or less ornate gable, thus aptly emphasising the construction; what more despicable than to insert for external effect, a window of respectable dimensions in a wall, this window being, however, partially built against solid walling. Many eighteenth-century and indeed some nineteenth-century buildings supply instances of this defect.

A writer, but seldom read nowadays, has well advised architects to be what they would seem, instead of seeking to seem what they would be.

In conclusion, it is sufficient to express a hope that the foregoing pages will bear a not unwelcome message to the patient reader, and will lead such to apply the principles, underlying all true design, to all work entrusted by the client for solution. Theoretically it is of equal importance to scheme an artisan's dwelling as carefully as a palace ; but practically it is of greater importance, for the difficulties of satisfying hygienic requirements are in inverse ratio to the space at disposal.

The artist, it is said, can picture to himself the Venus in the rough block of marble ; and similarly in the clients' lists of requirements should architects be able to foreshadow the gradual and successful evolution of the desired buildings ; and they will be in a better position to do this, by possessing a thorough knowledge of the principles that form the foundation-stone of the art of architecture.

TABLE OF USEFUL MEMORANDA AFFECTING THE PLANNING OF BUILDINGS.

*N.B.—An * shows an extract from Hurst's "Handbook."*

	ACCOMMODATION.	DIMENSIONS.
Altar (Altar Communion or Holy, Table)		3′ 0″ to 9′ 0″ long × 2′ 0″ to 2′ 6″ wide.
Art scholar (in Drawing-class Room)	30′ 0″ super.	
Assembly Hall (Secondary school)—		
Per scholar up to 150	8′ 0″ super.	
„ above 150	6′ 0″ super.	
Avenues, Cart, in Market-house		20′ 0″ to 30′ 0″ wide.
*Ball-room, per guest	16′ 0″ super. (min.).	
Bath, Plunge (unenclosed)	(maximum) 6′ 3″ × 2′ 8″ over all.	
* „ „ (Water supply)	40 to 50 gallons.	
* „ Shower („)	3 to 6 gallons.	
Baths (Boarding schools)	8 per cent. of boarders.	
„ (Douche) each		3′ 6″ × 3′ 6″.
„ (Slipper) each		5′ 3″ × 2′ 0″ and 2′ 4″ (and 1′ 11″ deep).
„ „ (each compartment)		6′ 0″ × 6′ 0″ to 9′ 0″ × 8′ 0″.
Bed in Hospital Ward		6′ 3″ × 3′ 4″.
„ „ „ (Space along wall between beds)		8′ 8″.

Bed in Hospital Ward (Space across centre gangway between beds)		10′ 6″ minimum.
„ in House, Double		6′ 6″ × 4′ 6″ minimum.
„ „ „ , Single		5′ 6″ × 2′ 6″ to 6′ 6″ × 2′ 3″.
„ for Infant (Cot)		4′ 0″ × 2′ 0″ to 4′ 6″ × 2′ 6″.
„ „ School		5′ 6″ × 2′ 6″.
„ „ „ Space along wall between beds		3′ 0″ minimum.
„ „ Secondary School. Space along wall between beds in Sick-room		6′ 0″.
Bedroom (Dormitory) accommodation in Block Homes	360′ 0″ cube per inmate.	
„ „ „ „ Cottage Homes	300′ 0″ cube per inmate.	
„ „ „ „ Schools	65′ 0″ super., 800′ 0″ cube, per inmate.	
„ in Hotel (averages)		12′ 0″ × 8′ 0″.
Bench, Cabinetmaking (Schools)		6′ 0″ × 2′ 0″.
„ , Carpenter's		3′ 4″ × 1′ 4″ to 7′ 0″ × 2′ 0″.
„ , Joiner's		From 10′ 0″ to 14′ 0″ long × 2′ 3″ wide × 2′ 8″ high.
„ (Metalwork) per scholar	4′ 0″ lineal.	
„ , Saw		4′ 0″ × 2′ 0″ (24″ Saw) to 8′ 0″ × 3′ 0″ (48″ Saw).
„ (Woodwork) per scholar	2′ 6″ × 5′ 0″	5′ 0″ × 1′ 6″ to 8′ 0″ × 3′ 0″.
„ „ Space between benches alongside		4′ 0″ minimum.
Bicycle House		6′ 3″ × 2′ 0″ minimum.
Billiards Table		12′ 0″ × 6′ 0″ to 6′ 0″ × 3′ 0″.
„ „ Gangway surrounding		4′ 6″ to 6′ 0″.
Bins. See "Wine Bins."		
Block Homes. See "Bedroom."		

	ACCOMMODATION.	DIMENSIONS.
Boiler (Cornish and Lancashire) - - - - - - -		12′ 0″ long × 4′ 0″ diameter to 30′ 0″ long × 7′ 0″ diameter.
„ , Milk (steam-jacketed) - - - - - - - - -		2′ 3″ to 2′ 6″ diameter.
„ , Portable - - - - - - - - - -		3′ 2″ × 2′ 4″ × 3′ 4″ to 5′ 0″ × 3′ 8″ × 5′ 1″ high.
„ , Saddle - - - - - - - - - -		1′ 6″ × 11″ × 10″ to 6′ 0″ × 2′ 6″ × 2′ 6″ high.
Butcher's Refrigerating Chamber - - - - - - -		4′ 6″ × 3′ 6″ to 7′ 0″ × 6′ 0″.
Cabinetmaker. See "Bench."		
Calf (in Abattoir) - - - - - - -	8′ 0″ super.	
Carpenter. See "Bench."		
Cashier's Box - - - - - - - - - -		3′ 0″ × 2′ 6″ minimum.
Casual Ward. See "Workhouse."		
Cell, Prison Association - - - - - - - - -		(say) 14′ 0″ × 14′ 0″.
„ „ Solitary - - - - - - - - -		13′ 0″ × 7′ 0″ super., and 600′ 0″ to 800′ 0″ cube.
„ See also "Workhouse."		
Central Hall (Elementary School) per scholar - - -	3′ 6″ to 4′ 0″ super.	
Chair Space in Theatres, &c. See "Seating."		
Champagne Bins. See "Wine Bins."		
Chapel. See "Seating" and "Stairs."		
Children, Elementary School. Class-room, per boy or girl -	10′ 0″ super. minimum.	
„ „ „ „ „ infant -	9′ 0″ „ „	
„ „ „ Desk (Boy's or Girl's), Dual -	- - -	3′ 4″ × 2′ 0″.
„ „ „ „ „ „ Long -	1′ 6″ per scholar.	
„ „ „ „ (Infant's), Dual - -	- - -	3′ 0″ × 2′ 0″.
„ „ „ „ „ Long - -	1′ 4″ per child.	
„ Higher Elementary School. Class-room, fitted with Dual Desks - - - - - -	12′ 0″ super. per scholar.	

(Children, Higher Elementary School. Class-room, fitted with) Single Desks	15′ 0″ " " "	
" Secondary School. Class-room per scholar †	17′ 0″ to 18′ 0″ super.	
" " " " Single Desks		3′ 0″ × 2′ 0″.
" " " Dormitory	65′ 0″ super., 800′ 0″ cube, per scholar.	
" " " in Sick Room	1,000′ 0″ cube per patient.	
" See also references under "School."		
Church (including proportion for Holy Table, Gangways, &c.)	5′ 0″ to 7′ 0″ super.	
" See also "Seating."	per worshipper.	
Cistern. See "Tank."		
Class-room. See "Art scholar," "Children," "Cookery," "Gangway."		
Cloak-pegs (Schools) apart		1′ 0″.
" " As fixed in two heights chequerwise, gives for each foot run	2 pegs.	
Coach-house doors		8′ 0″ wide.
Coals. Allow per ton in cellar	(average) 45′ 0″ cube.	
Communion Table. See "Altar."		
Concert Hall. See "Seating," "Stairs."		
Confectioner: See also "Oven."		
" Show-window		1′ 6″ to 2′ 6″ depth.
Cookery Class (Secondary School), per scholar	30′ 0″ super.	
" " " " Proportion of table per scholar	2′ 6″ square.	
Copper, Washing	Ranging from	1′ 3″ to 2′ 6″ diameter for pan.
Corridor (Elementary Schools) for Boys or Girls	" "	8′ 0″ to 12′ 0″ wide.
" " " " Infants		12′ 0″ wide minimum.
Cot. See "Bed."		
Cottage Homes. See "Bedroom."		
" Range. See "Range."		

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† 16′ 0″ superficial is allowed by the Board, if necessary.

	ACCOMMODATION.	DIMENSIONS.
Counter		2′ 6″ to 4′ 0″ wide.
Cow in Abattoir	24′ 0″ super.	
„ (Water supply, per day)	45 gallons.	
Cow-house, Dunging Passage		4′ 6″ wide, including gutter.
„ „ Feeding „		3′ 6″ wide.
„ „ Stall (double)		7′ 0″ × 7′ 0″.
„ „ „ (single)		4′ 6″ × 6′ 0″ to 7′ 0″.
*Cow-shed (Shelter only), per beast	40′ 0″ to 60′ 0″ super.	
Cubicle for Nurse		13′ 0″ × 8′ 6″.
„ „ School dormitories		8′ 0″ × 8′ 0″.
Desks. (Also see "Children.")		
„ for Office clerks		2′ 6″ to 3′ 0″ in depth.
Dining Hall, per scholar	10′ 0″ super.	
„ table (ordinary), per diner	2′ 0″ width minimum.	
„ „ (social)		5′ 0″ × 3′ 3″ to 12′ 0″ × 4′ 9″ (and more).
Dog in Kennel (see also "Kennel")	2′ 6″ to 12′ 0″ super.	
Draper's Show-window		5′ 0″ to 7′ 0″ depth.
Drawing-room, per occupant (excluding general furniture)	10′ 0″ super.	
Dresser in Kitchen or Scullery (average)		5′ 6″ × 1′ 6″.
Dressing-box, Swimming Baths (Men)		3′ 0″ × 3′ 0″.
„ „ „ „ (Women)		4′ 6″ × 4′ 0″.
„ „ Turkish Baths, "Apodyterium"		6′ 0″ × 6′ 0″ (one person), 7′ 0″ × 6′ 0″ (two), 12′ 0″ × 12′ 0″ (four).
„ „ „ „ „ , Couch in		6′ 0″ × 2′ 0″.
Dressing-table (Area of top)	Ranging from	2′ 9″ × 1′ 6″ to 4′ 6″ × 2′ 0″.
Drying Closet, Ordinary draw-out		1′ 0″ wide.
„ Horse, Radial		4′ 6″ to 7′ 0″ diameter.
Earth-closet apparatus		1′ 10″ to 3′ 0″ wide by 2′ 4″ deep.

Engine, Electric Lighting (bed-plate size)	4′ 0″ × 1′ 6″ to 6′ 8″ × 2′ 0″.
„ („ „) and Dynamo (combined)	5′ 6″ × 2′ 3″ to 25′ 0″ × 3′ 3″.
„ (Gas or Oil)	4′ 6″ × 2′ 7″ to 14′ 3″ × 13′ 6″.
Engine-house, Fire Brigade	40′ 0″ × 28′ 3″.
Fire. See “Engine-house.”	
Font	1′ 6″ to 2′ 6″ diameter.
Forge	2′ 2″ × 2′ 10″ to 2′ 0″ × 1′ 6″.
„ (circular)	1′ 6″ to 2′ 6″ diameter.
Fruiterer’s Show-window	6′ 0″ to 8′ 0″ depth.
Gangway for Assistants behind Counter	2′ 6″ wide.
„ in Class-room between Desks (Dual)	1′ 4″ „
„ „ „ „ „ (Long)	1′ 6″ „
„ „ Cloak-room (Schools)	4′ 0″ „ minimum.
„ „ Cow-house	3′ 6″ „
„ „ Restaurant	3′ 0″ „ minimum.
„ „ Stables	8′ 0″ to 10′ 0″ wide.
„ „ Theatres alongside rows of seats	3′ 6″ wide.
„ „ „ in front of each seat	1′ 0″ „
Hat-pegs. See “Cloak-pegs.”	
Hay per truss of 56 lbs.	12′ 0″ cube.
Hay-rack, Angular	2′ 6″ to 3′ 0″ across top.
„ Central	2′ 4″ × 1′ 4″.
Holy Table. See “Altar.”	
Horse. See “Hay,” “Manger,” “Stables.”	
Hospital Ward, per patient, including gangways	144′ 0″ to 156′ 0″ super., 1,800′ 0″ to 2,000′ 0″ cube.
* „ „ „ „ (Water supply)	27 gallons per day.

	ACCOMMODATION.	DIMENSIONS.
Hot Closet		3′ 0″ to 6′ 0″ long × 2′ 0″ wide.
Hotel. See "Bedroom," "Range."		
*House, Daily water supply per inmate	20 to 25 gallons.	
Hydro-extractor. See "Laundry."		
*Ice (Storage-room, per cwt.)	6′ 0″ cube.	
Inclined Planes (maximum gradient in London theatres)	1 in 10.	
Kennel, per each box and each yard (see also "Dog")	36′ 0″ super.	
Kitchen Range. See "Range."		
„ Table		4′ 6″ × 3′ 0″.
Laboratory	30′ 0″ per scholar.	
Laundry Hydro-extractor		1′ 10″ to 3′ 6″ diameter.
„ Mangle ("box" type)		6′ 0″ × 2′ 8″ to 8′ 6″ × 3′ 3″.
„ Table (Schools)	3′ 0″ lineal per scholar.	
Lavatory Basins (for houses), Circular		10″ to 1′ 10″ diameter.
„ „ „ Oval		1′ 2″ × 12″ to 2′ 3″ × 1′ 9″.
„ „ (Secondary Schools), 100 scholars or less	10 per cent.	
„ „ „ „ over 100 scholars	$6\frac{2}{3}$ per cent.	
Lecture-room „ „ 30 scholars or less (min.)	14′ 0″ super. per scholar.	
„ „ „ „ over 30 scholars „	12′ 0″ „ „ „	
Library (accommodation per reader at table) Magazine-room	2′ 0″ × 1′ 3″.	
„ „ „ „ News-room	2′ 6″ × 1′ 0″.	
„ Bookcase (in house, say)		4′ 0″ × 10″.
„ „ Plinth portion for Folios		2′ 4″ deep.
„ Book-lift. See "lift."		
„ Counter in Lending Library		2′ 0″ wide.
„ table in Magazine-room		2′ 0″ wide minimum.
„ „ News-room		2′ 6″ „ „

Lift: Cage for—	
Books	9″×9″; 1′ 0″×1′ 0″.
Carriages and Motor Cars	16′ 0″×8′ 0″.
Cellar	2′ 6″×2′ 0″ minimum.
Coal	2′ 0″×2′ 0″.
Dinner, &c.	1′ 0″×10″ minimum.
Hospital Patient on a Bed	7′ 6″×4′ 6″.
Luggage	2′ 6″×2′ 6″ minimum.
Passenger	2′ 6″×3′ 0″ „
Warehouse	2′ 0″×1′ 6″ to 9′ 0″×5′ 0″.
Loose Box. See "Stables."	
Manger, Angle (circular)	1′ 6″ to 1′ 8″ across top.
„ „ (square)	3′ 6″×2′ 4″ to 3′ 5″×3′ 5″ with 1′ 6″ projection.
„ Centre	2′ 1″×11″ to 3′ 0″×1′ 4″.
„ sets	4′ 0″×1′ 6″ to 6′ 0″×1′ 6″.
Mangle. See "Laundry."	
Market Avenue	20′ 0″ to 30′ 0″ wide.
„ Shop	12′ 0″×8′ 0″.
„ Stall	5′ 0″×5′ 0″ to 6′ 0″×6′ 0″.
Metal-workers. See "Bench."	
Milliner's Show-window	2′ 6″ wide (average).
Motor-carriage House	from 22′ 0″×12′ 0″ upward.
Music canterbury	1′ 6″×1′ 0″ to 2′ 0″×1′ 3″.
„ practice-room (Secondary School)	(*circa*) 8′ 0″×6′ 6″.
Nurses' cubicles. See "Cubicle."	
Oven, Baker's (for each bushel or bread) 7′ 0″ to 12′ 0″ super.	
* „ „ Portable	2′ 8″×2′ 8″ to 11′ 0″×11′ 0″.
„ Confectioner's	2′ 8″ to 3′ 2″×2′ 0″.

	Accommodation.	Dimensions.
Ox in Abattoir	24′ 0″ super.	
* „ in Shed (Shelter only)	40′ 0″ to 60′ 0″ super.	
„ (Water supply, per day)	45 gallons.	
Passage to Theatre (External)		10′ 0″ wide.
„ „ (Internal)		3′ 6″ wide.
Pianoforte, Horizontal Grand		5′ 6″ × 4′ 9″ to 9′ 0″ × 5′ 3″.
Pig in Abattoir	6′ 0″ super.	
* „ in Shed (Shelter only)	10′ 0″ super.	
„ (Sow and Litter in "Box")	80′ 0″ super.	
* „ (Water supply, per day)	1 gallon.	
Playground, per scholar, in Elementary Schools	50′ 0″ super.	
Poultry House and Run (for 12 fowls)		4′ 0″ × 4′ 0″.
„ „ „ (for 50 „)		8′ 0″ × 6′ 0″.
Prison. See "Cell."		
Pulpit		3′ 6″ min. diameter.
Rack, Cow-house		6′ 6″ to 8′ 0″ long × 1′ 8″ top width × average 12″ deep.
„ (Stables). See "Hay rack" and "Manger."		
Range, Cottage		2′ 0″ to 3′ 2″ wide.
„ , Hotel		6′ 0″ to 15′ 0″ wide.
„ , Kitchen		3′ 6″ to 7′ 0″ wide × 1′ 8″ to 1′ 10″ deep.
Restaurant table. See "Table."		
School. See "Art Student," "Assembly Hall," "Baths," "Bed," "Bedroom," "Bench," "Central Hall," "Children," "Class-rooms," "Cloak-pegs," "Cookery," "Corridor," "Cubicle," "Dining," "Gangway," "Laboratory," "Laundry," "Lavatory," "Lecture," "Music," "Playground," "Urinals," "Water-closets," "Workshop."		

	Seating Accommodation—		
*	Church, Free Sitting (Adult)	1′ 8″ × 2′ 3″ deep.	
	„ „ (Child)	1′ 2″ × 2′ 3″.	
	„ Rented Sitting	1′ 8″ × 2′ 10″.	
	London theatres, &c., Gangway in front of seats		1 0″ minimum.
	„ „ „ per spectator (chairs with arms or backs)	1′ 8″ × 2′ 4″.	
	„ „ „ per spectator (chairs without arms or backs)	1′ 6″ × 2′ 0″.	
	Sheep in Abattoir, per beast	6′ 0″ super.	
*	„ in Shed (Shelter only), per beast	10′ 0″ super.	
*	„ (water supply, per day)	1 gallon.	
	Sink		1 8″ × 1′ 3″ to 4′ 0″ × 2′ 0″.
	„ Hospital		1 9″ × 1′ 3″ to 3′ 6″ × 2′ 0″.
	„ Slop		1′ 3″ to 2′ 9″ long × 1′ 6″ to 1′ 10″ deep.
	Slaughter-house (Killing Shed), average		100′ 0″ × 50′ 0″.
	Soldier (in Barrack-room)	60′ 0″ super.	
*	„ (water supply, per day, for all purposes)	15 gallons.	
	Stables Door		4′ 0″ wide.
	„ Fittings. See "Hay-rack," "Manger."		
	„ Gangway behind Stalls		8′ 0″ to 10′ 0″ wide.
	„ Loose Box (Cavalry Stables)		17′ 0″ × 12′ 0″.
	„ „ (Ordinary „)		12′ 0″ × 10′ 0″ to 12′ 0″.
	„ Stall (Cavalry Stables)	100′ 0″ super.	
	„ „ (Infirmary „)	130′ 0″ super.	
	„ „ (Ordinary „)	57′ 0″ to 63′ 0″ super.	6′ 0″ × 9′ 6″ to 10′ 6″.
*	„ Water supply, per day, [Artillery horse and carriage]	10 gallons.	
*	„ „ „ „ [Carriage (four wheels)]	20 „	
*	„ „ „ „ [„ (two wheels)]	8 „	
*	„ „ „ „ [Cart (four wheels)]	12 „	
*	„ „ „ „ [Cavalry Horse (all purposes)]	8 „	
*	„ „ „ „ [Ordinary Horse (all purposes)]	15 „	

	ACCOMMODATION.	DIMENSIONS.
Stairs, London churches, lecture-rooms, &c.—		
Not exceeding 200 congregants		3′ 6″ wide.
200 to 400		4′ 6″ ,,
Per 100 additional		6″ increase in width.
Maximum		9′ 0″ wide.
,, London theatres, &c.: for the use of the audience—		
not exceeding 300 people as users		4′ 0″ wide minimum.
exceeding ,, ,,		5′ 0″ ,,
(*N.B.*—For further regulations, see p. 187.)		
,, in Secondary Schools. (See further: Rule 4 in Appendix D.)		4′ 0″ to 6′ 0″ wide.
Stoves, Gas Cooking		1′ 2″ × 1′ 3″ to 2′ 3″ × 2′ 4″.
,, Grilling		2′ 0″ to 4′ 0″ wide by 1′ 9″ to 2′ 0″ deep.
,, Ordinary		1′ 3″ × 1′ 3″ to 3′ 2″ × 4′ 3″.
Straw per truss of 36 lbs.	6′ 6″ to 10′ 0″ cube.	
Table, Restaurant (Circular top)		1′ 8″ to 2′ 4″ diameter.
,, ,, (Straight ,,)		3′ 0″ × 1′ 6″ to 7′ 0″ × 4′ 0″
,, See "Altar," "Billiards," "Dining," "Dressing," "Kitchen," "Library."		
Tanks, Hot-water (Cylindrical)		1′ 3″ diameter × 2′ 6″ high to 1′ 8″ diameter × 4′ 0″ high.
,, ,, (Straight Sides)		1′ 7″ cube to 3′ 1″ × 2′ 7″ × 2′ 3″.
Tea Chests	Range from	2′ 9″ × 1′ 10″ (Bohea) to 1′ 6½″ × 1′ 6″ (Hyson).
Theatre. See "Gangway," "Passage," "Seating," "Stairs."		
Turnstile		5′ 6″ and 6′ 0″ diameter.

Urinal accommodation in Elementary School	10 feet per 100 boys.	
,, ,, ,, Secondary ,,	1 per 15 scholars.	
,, apparatus		(average) 12″ wide.
,, compartments		1′ 8″ × 11″ to 2′ 0″ × 1′ 4″.
Washing Box, Public Wash-houses		3′ 6″ × 3′ 0″.
Water-closet, Boarding School, Day accommodation	4 per 30 scholars.	
,, ,, ,, Night ,,	1 ,, 20 ,,	
,, Day School, Boys'	1 ,, 25 ,,	
,, ,, Girls' (for first 100 girls)	1 ,, 15 ,,	
,, ,, ,, (above ,, ,,)	1 for each 25 scholars further.	
,, seat		1′ 3″ × 1′ 10″ to 1′ 8″ × 2′ 6″
Wine Bins, for each bottle	3′ 6″ width.	
,, French (6 dozen Champagne)		2′ 0″ × 1′ 0″ × 4′ 4″ high
,, ,, (24 ,, ,,)		4′ 0″ × 1′ 0″ × 8′ 8″.
,, ,, (6 ,, general)		2′ 0″ × 1′ 0″ × 4′ 0″.
,, ,, (24 ,, ,,)		3′ 9″ × 1′ 0″ × 8′ 0″.
Woodwork. See "Bench."		
Workhouse, Casual Wards (Sleeping Cell)		8′ 0″ × 4′ 6″.
,, ,, ,, (Working ,,)		5′ 6″ × 4′ 6″.
,, Dormitory, per inmate	36′ 0″ super. (50′ 0″ super. per woman and child).	
,, ,, and Meal Room combined, per inmate	54′ 0″ super.	
,, Infirmary, per inmate	600′ 0″ to 960′ 0″ cube.	
,, ,, ,, (London)	850′ 0″ to 1,200′ 0″ cube.	
Workshop, per scholar in Secondary School (for 20 scholars)	35′ 0″ super.	

APPENDIXES.

APPENDIXES.

APPENDIX A.

LONDON BUILDING ACT, 1894, SECTION 80, GIVING THE RULES AS TO TREATMENT OF STAIRCASES IN CHURCHES AND CHAPELS, ETC., WITHIN THE ADMINISTRATIVE COUNTY OF LONDON.

THE following rules shall be observed with respect to new churches, chapels, meeting-houses, public halls, public lecture-rooms, public exhibition-rooms and public places of assembly, or additions or alterations by which increased accommodation is to be provided to existing churches, chapels and meeting-houses, public halls, public lecture-rooms, public exhibition-rooms or public places of assembly :—

(*a.*) Every staircase for the use of the public shall be supported and enclosed by brick walls not less than 9 in. thick. The treads of each flight of stairs shall be of uniform width.

(*b.*) No staircase, internal corridor or passage-way for the use of the public shall be less than 4 ft. 6 in. wide. Provided that where not more than two hundred persons are to be accommodated in such church, chapel, meeting-house, hall, lecture-room, exhibition-room or place of assembly, such staircase, internal corridor or passage way may be of the width of 3 ft. 6 in.

(*c.*) Every staircase, corridor or passage-way for the use of the public, and which communicates with any portion of the building intended for the accommodation of a larger number of the public than four hundred, shall be increased in width by 6 in. for every additional one hundred persons until a maximum width of 9 ft. be obtained. Provided always that in every case where the staircases are 6 ft. wide and upwards, they shall be divided by a handrail. Provided also that in lieu of a single staircase, corridor or passage-way of the width in this sub-section prescribed, it shall be lawful to substitute two staircases, corridors or passage-ways, each being of a width at least equal to two-thirds of the width in this sub-section prescribed for the single staircase, corridor or passage-way, but so that neither of such two substituted corridors, staircases or passage-ways shall be less than 3 ft. 6 in. wide.

(*d.*) In all cases where a portion of the public is to be accommodated over or at a higher level than others of the public, a separate means of exit of the width above prescribed for staircases, internal corridors or passage-ways, and communicating directly with the street or open space, shall be provided from each floor or level.

(*e.*) All doors and barriers shall be made to open outwards, and no outside locks or bolts are to be affixed thereto.

APPENDIX B.

LONDON COUNTY COUNCIL.

THE METROPOLIS MANAGEMENT AND BUILDING ACTS AMENDMENT ACT, 1878.

THE PROTECTION OF THEATRES, ETC., FROM FIRE.

REGULATIONS MADE BY THE COUNCIL ON THE 30TH JULY 1901, WITH RESPECT TO THE REQUIREMENTS FOR THE PROTECTION FROM FIRE OF THEATRES, HOUSES, ROOMS, AND OTHER PLACES OF PUBLIC RESORT WITHIN THE ADMINISTRATIVE COUNTY OF LONDON.

THESE regulations shall, unless otherwise specified, apply to all theatres, houses, rooms, or other places of public resort within the Administrative County of London, to be hereafter constructed and to be kept open for the public performance of stage-plays, and to all houses, rooms, or other places of public resort within the said County, to be hereafter constructed and to be kept open for public dancing, music, or other public entertainment of the like kind, under the authority of letters patent from His Majesty the King, his heirs or successors, or of Licenses by the Lord Chamberlain of His Majesty's Household, or by the London County Council.

In these regulations the expression "such premises" means a theatre, house, room, or other place of public resort to be kept open for any of the purposes aforesaid.

1. Every person who shall be desirous of obtaining authority

to open any such premises within the said County, shall first make public his intention to erect such premises by exhibiting a notice-board on the proposed site in such a position that it can be plainly seen from the public way, or by advertisement in three newspapers circulating generally throughout the county or throughout the locality in which it is proposed to erect such premises, and shall then make an application in writing to the Clerk of the Council for a certificate under the Metropolis Management and Building Acts Amendment Act, 1878. For the purposes of the advertisement, differently dated issues of one paper shall count as different papers. The notice-board shall be maintained until the application has been dealt with by the Council. No application will be considered before the expiration of one fortnight after the receipt by the Clerk of the Council of a copy of the notice exhibited on the site or of each of the newspapers containing the advertisement.

The application shall contain a statement as to the nature and extent of the interest of such person in such premises, and the character of the entertainment for which such premises are proposed to be used. The application shall be accompanied by complete plans, elevations, and sections in duplicate, drawn on the dull side of tracing linen, to a scale of $\frac{1}{8}$ in. to a foot; and by a block plan on a separate sheet showing the position of such premises in relation to any adjacent premises, and to the public thoroughfares upon which the site of such premises abuts, drawn to a scale of not less than $\frac{1}{20}$ in. to a foot.

A plan and section of the drains proposed to be laid from such premises shall be submitted at the same time, and such plan shall indicate the sewer or sewers to which the drains are to be connected, and the section shall show the surface level of the street, the level of the lowest portion of the premises which is to be drained, and the level of the sewer or sewers. All levels shall be given in relation to ordnance datum.

All drawings shall be coloured to distinguish the materials employed in the construction of the building.

The width of all staircases, and the number of stairs in each, the width of corridors, gangways, and doorways, together with the heights of the tiers and other parts of such premises, shall be indicated on such drawings.

The thickness of the walls and scantlings of the various materials shall be clearly shown on such drawings by figured dimensions.

The cardinal points shall be marked upon each plan.

The plans shall show the respective numbers of persons to be accommodated in the various parts of such premises, and the area to be assigned to each person, and shall be accompanied by a specification of the works to be executed, describing such of the materials to be employed and the mode of construction to be adopted as may be necessary to enable the Council to judge whether the requirements of these regulations will, when such premises have been completed, be complied with.

In the case of schools and halls used for parochial or mission purposes, and having a superficial area for the accommodation of the public of not more than 1,000 sq. ft., elaborate drawings will not be required, but sufficient detail shall be given to indicate the part of the premises to be used for public entertainments and the surroundings.

One copy of such drawings and specification will be returned to the applicant, if it is so desired, but the other copy shall remain the property of the Council.

Frontage and external passages.

2. One-half at least of the total length of the boundaries of the site of any such premises which consist of an entire building, and in case of a room or other such premises not consisting of an entire building, one-half at least of the total length of the boundaries of the site of the building of which such room or other such premises form part, shall abut upon or front to public thoroughfares, of which one thoroughfare at least shall not be less than 40 ft. wide, and of the remainder none shall be less than 30 ft. wide if a carriageway, or 20 ft. wide if a footway. These widths shall continue for the whole length of the roads between the nearest thoroughfares in each direction connecting therewith. The frontage of the site to a thoroughfare not less

than 40 ft. wide shall not be less than one-sixth of the total length of the boundaries of the site.

If, in order to comply with No. 10 of these regulations, an additional passage or way should be necessary, it may be provided by means of a private passage or way.

Such passage or way shall not be less than 10 ft. wide, and shall be under the complete control of the owner of such premises, and, if less than 20 ft. wide, no doors or other openings of the adjoining premises shall communicate therewith or overlook any portion of such passage or way.

Distinctive site.

3. No such premises, in which a stage will be erected and in which scenery will be used, shall be constructed underneath, or on the top of, any part of any other building, nor shall such premises contain living rooms.

As to openings in walls.

4. No openings shall be allowed in the walls or roof of such premises within 20 ft. of any adjoining property unless a brick wall of the thickness prescribed by the Building Act be erected between such premises and the adjoining property to such a height that no part of any opening either in such premises or in any building which may be erected on such adjoining property shall be higher than the part of the wall immediately opposite to it. A similar wall shall be erected between any openings in such premises and any inflammable structure, erection, or material on any adjoining property.

Walls.

5. All such premises shall be enclosed with proper external or party walls of brick or stone.

The thickness of all external party or cross walls shall not be less than the thickness prescribed by the London Building Act, 1894 (clause 12 of Part II. of the 1st Schedule to such Act excepted), for walls of similar height and length in buildings of the warehouse class, or such greater thickness as shall be required by the District Surveyor or the Tribunal of Appeal under section 78 of the London Building Act, 1894.

Where such premises are part of another building they shall be cut off from such other building by party walls and party structures of fire-resisting materials in a manner to be approved by the Council, and no part of such premises shall overlook any portion of the adjoining part which may be liable to communicate fire to such premises.

Fire-resisting floors, tiers, and roof.

6. In all such premises the floors, tiers, and roof of the auditorium, and all parts used by the public, shall be constructed of fire-resisting materials to the satisfaction of the Council, and the flooring, if of wood and not laid on solid foundations, shall be laid with iron tongues.

Tiers.

7. No such premises shall have more than three tiers or horizontal divisions including the gallery, above the level of the pit.

Where the front seats of any tier are separated from the other seats by a partition, such seats shall not count for the purpose of this regulation as a separate tier.

8. Where the first tier or balcony of such premises extends over the pit, stalls, or area, the height between the floor of the pit and the first tier shall not be at any part less than 10 ft.; the height between the floor of the highest part of the gallery and the lowest part of the ceiling over the same shall not be less than 12 ft. The height between the tiers shall in no case be less than 8 ft.

Pit.

9. In all such premises the floor of the highest part of the pit, or of the stalls where there is no pit, shall not be more than 6 in. above the level of the street at the principal entrance to the pit, and the lowest part of the floor of the pit or stalls shall not be lower than the level at which it can be effectually drained by gravitation into a public sewer, nor more than 15 ft. below the level of the street at the principal entrance to the pit.

In any case the lowest floor shall not be placed at such a level as will render it liable to flooding, and such premises shall be efficiently and properly drained to the satisfaction of the Council.

Entrances and exits.

10. In all such premises two separate exits shall be provided from every tier or floor which accommodates not more than 500 persons, and where a tier or floor accommodates more than 500

persons, an additional exit shall be provided for every 250 or part of 250 persons above 500. Each of such exits shall be not less than 5 ft. wide between the walls at any point or between the leaves of the doors when open. Two of the exits from each tier or floor shall deliver into different thoroughfares or ways.

In the case of a tier or floor not accommodating more than 300 persons, two 4 ft. exits will be required.

If any tier or floor shall be divided into two or more parts, exits as set out above shall be provided from each of such parts.

In calculating the number of persons which can be accommodated in any tier or part of a tier of such premises, the standing space from which a view of the performance can be obtained (with the exception of that afforded by the intersecting gangways)* will be considered as well as the seated area.

Exits shall be arranged so as to afford a ready means of egress from all parts of each tier or floor, and shall lead directly into a thoroughfare or way.

It shall be compulsory on the management of such premises to allow the public to leave by all exit doors.

Corridors, passages, &c.

11. Every lobby, corridor, or passage in such premises intended for the use of the audience shall be formed of fire-resisting materials, and shall be at the narrowest point when finished of the widths specified in No. 10 of the regulations for exits.

Where possible, inclines shall be used instead of steps, but no corridor, passage, or gangway shall be inclined to a steeper gradient than 1 in 10.

There shall be no recesses or projections in the walls of such corridors or passages within 5 ft. of the floor.

Vestibules.

12. Where vestibules are provided in such premises, not more than three tiers or floors or (where such tiers or floors are divided into two or more parts) not more than three of such parts of tiers or floors shall communicate with one vestibule.

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* The words in parenthesis were inserted by order of the Council on 4th February 1902.

The aggregate width of all the doorways or passages that lead from a vestibule towards a thoroughfare or way shall be at least one-third greater than the aggregate width of all the exits (required by the regulations) that lead to such vestibule.

Cloak-rooms.

13. The corridors in such premises shall not be used as cloak-rooms, and no pegs for hanging hats and cloaks shall be allowed therein.

Where cloak-rooms are provided, they shall be so situated that the persons using them shall not interfere with the free use of any exit way.

Staircases.

14. All staircases in such premises intended for the use of the audience from any tier or part of a tier accommodating not more than 300 persons shall be at least 4 ft. wide at their narrowest parts, and those intended for the use of the audience from any tier or part of a tier accommodating more than 300 persons shall be at least 5 ft. wide at their narrowest parts.

All such staircases shall have solid square (as distinguished from spandril) steps and landings of York or other approved stone, or of such other fire-resisting material and construction as the Council may in any special case approve, with treads not less than 11 in. wide and with risers not more than 6 in. high (each lapping at least 1 in. over the back edge of the step below it), without winders, in flights of not more than fifteen or less than three steps each.

The treads and risers of each flight of steps shall be of uniform width and height, and the steps shall be pinned into brick walls at both ends.

The several flights of such steps shall be properly supported and enclosed to the satisfaction of the Council.

No staircase shall have more than two flights of fifteen steps each without a turn, the depth of the landing between such flights being at least the same as the width of the staircase.

All landings shall be 6 in. thick.

Every staircase shall have a roof of fire-resisting materials to be approved by the Council.

A continuous and uninterrupted handrail shall be fixed on both sides of all steps and landings, supported by a strong metal brackets built into the wall, but such handrails shall not project more than 3 in.

Where the flights of steps re-turn, the newel wall shall be chased so as to allow the handrail to turn without projecting over the landing.

There shall be no recesses or projections in the walls of such staircase within 5 ft. of the floor, and any gas or electric light fittings shall be at least 6 ft. 8 in. above the steps or landings.

Doors and fastenings.

15. All doors in such premises used by the public as exit doors shall, except where otherwise approved, be hung in two folds, and be made to open outwards towards the thoroughfare or way.

All internal doors shall be hung so as not to obstruct, when open, any gangway, passage, staircase, or landing.

No door shall open immediately upon a flight of steps, but a square landing at least 3 ft. in width shall be provided between such steps and such doorway.

All exit doors, having fastenings, shall be fastened by automatic bolts only, of a pattern and in a position to be approved by the Council; but where such doors are also to be used by the public for entrances, they may be fitted with lever or other approved fastenings in approved positions. Doors so fitted, however, must not be fastened during the presence of the public.

All doors and all gates used for entrances shall be made to open both ways, and shall, when opened inwards, be so fitted that they can be locked back against the wall in such a manner as to require a key to release them.

All doors leading from exit passages, staircases, or corridors to the other parts of the building shall be hung so as to be closed by the stream of persons passing from the auditorium to the street, and be fitted with springs. No door handles or other fittings shall project into exit ways more than 1 in. when the doors are open.

All barriers and internal exit doors shall be made to swing or to open outwards, with no other fastenings than automatic bolts.

No locks, monkey-tail, flush or barrel bolts, or locking bars, or other obstructions to exit, other than as before mentioned, shall be fitted on any doors, gates, or barriers.

Exit, &c., notices.

16. All exit and other doors or openings in such premises used by the public for the purposes of exit shall be indicated by notices clearly painted to the satisfaction of the Council in 7-in. letters.

Such notices shall, where possible, be painted over such doors or openings at a height of at least 6 ft. 9 in. above the floor.

The words "no exit" shall be clearly painted to the satisfaction of the Council in 7-in. letters at least 6 ft. 9 in. above the floor, over all doors or openings, which are in sight of the audience, but which do not lead to exits.

Gangways.

17. Passages or gangways not less than 3 ft. 6 in. wide shall be formed leading direct to the exit doors, and gangways 3 ft. 6 in. wide shall be provided, intersecting the rows of seating in such a manner that no seat shall be more than 10 ft. from a gangway measured in the line of the seating.

Internal enclosures.

18. No enclosure shall be allowed in any such premises where the public can assemble for any other purpose than to view the performance, except so far as the Council shall consider necessary for the provision of refreshment-bars, or in the case of a theatre for the provision of a foyer.

Seating.

19. The seating area assigned to each person shall not be less than 2 ft. deep and 1 ft. 6 in. wide in all parts of the house where no backs or arms are provided to the seats, and not less than 2 ft. 4 in. deep by 1 ft. 8 in. wide where backs or arms are provided. In all cases, however, there shall be a space of at least 1 ft. in depth between the front of one seat and the back of the next measured between perpendiculars.

Chairs.

20. Where chairs are used in such premises, they shall be battened together at a distance of not less than 1 ft. 8 in. from centre to centre, where they have arms, and 1 ft. 6 in. where they are without arms, and in lengths of not less than four or more than twelve in a section.

Proscenium wall.

21. In all such premises where a stage with a proscenium will be erected, such stage shall be separated from the auditorium by a brick proscenium wall not less than 13 in. in thickness, and such wall shall be carried up the full thickness to a height of at least 3 ft. above the roof, such height being measured at right angles to the slope of the roof, and shall be carried down below the stage to a solid foundation.

Not more than three openings shall be formed in the proscenium wall, exclusive of the proscenium opening.

No such opening * shall exceed 20 sq. ft. in area. Each of such openings shall be closed with a wrought-iron door not less than $\frac{1}{4}$ in. thick in the panel, hung in a wrought-iron frame so as to close of itself without a spring, and with a 3-in. lap or with such other fire-resisting door and frame as may be approved by the Council.

No openings formed in the proscenium wall shall, at the lowest part, be at a higher level than 3 ft. above the floor of the stage.

All the decorations around the proscenium opening shall be constructed of fire-resisting materials.

Stage exit.

A separate exit shall be provided from the stage direct to a thoroughfare or way.

Stage lighting.

Wherever possible electric light shall be the only illuminant used for the stage.

Proscenium screen.

22. The proscenium opening shall be provided with a fire-resisting screen to be used as a drop curtain, of such pattern, construction, and gearing, and with such arrangements for pouring water upon the surface of the screen which is towards the stage, as may be approved by the Council.

Stage.

23. The space above the stage shall be of sufficient height to allow of all scenes and of the fire-resisting screen being raised above the top of the proscenium opening in one piece and without rolling.

The roof over the stage shall *not* be of fire-resisting material or heavy construction, and shall be provided with an opening at the back thereof equal at the base to $\frac{1}{10}$ the area of the stage.

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* Other than the proscenium opening (P. L. M.).

Such opening shall be glazed at the top and sides with sheet glass not more than $\frac{1}{12}$ in. in thickness, and be capable of being opened by the action of lowering the fire-resisting screen or by the cutting or burning of a cord, to an extent equal at least to the superficial area required at the base of the opening. Suitable exhaust cowls shall also be provided on the stage roof.

Flies.

24. The floors of the flies of such premises shall be constructed of fire-resisting materials to the satisfaction of the Council.

Gridiron.

Adequate means of escape shall be provided from the flies and the gridiron to the satisfaction of the Council.

Dressing-rooms.

25. Dressing-rooms shall be arranged in a separate block of buildings, or divided from such premises by party walls, with only such means of communication therewith as may be approved by the Council.

All dressing-rooms and staircases leading thereto shall be constructed of fire-resisting materials, and shall be connected with an independent exit leading directly into a thoroughfare or way.

All dressing-rooms shall be adequately ventilated to the outer air by windows in the external walls.

No decoration, or construction for the purpose of decoration, shall be employed in such dressing-rooms which does not adhere without any cavities to the surface of the wall.

No dressing-rooms shall be situated more than one story below the street level.

The exit doors from the dressing-room block shall be fitted with automatic bolts only.

Sufficient and separate water-closet accommodation shall be provided for the use of the male and female artistes and orchestra, and urinal accommodation for the use of males. Such water-closets shall be constructed and arranged to the satisfaction of the local sanitary authority.

Workshops, &c.

26. All workshops, store-rooms, wardrobe or painting rooms, in connection with such premises, shall be separated from such premises and from each other by brick walls not less than 9 in.

thick, and shall be placed in positions to be approved by the Council.

All openings in such walls shall be closed by fire-resisting doors as described in No. 21 of these regulations. Such doors may, however, be of such greater size as the Council may approve.

All such doors, if consisting of a single fold, shall be made to overlap the door frame at least 3 in. when closed; and, if made in two folds, such folds shall overlap each other (!), when closed, at least 3 in.

All floors and ceilings of such rooms shall be formed of fire-resisting materials.

All such rooms shall be ventilated by windows in the outer walls or otherwise to the satisfaction of the Council.

Sufficient and separate water-closet accommodation shall be provided for the use of the male and female workpeople, and urinal accommodation for the use of the male workpeople. Such water-closets shall be constructed and arranged to the satisfaction of the local sanitary authority.

Limelight tanks, boilers, and dynamos.

27. All limelight tanks, boilers with engines, and dynamos with engines in connection with such premises, shall be placed in ventilated chambers or buildings of fireproof construction.

Such chambers or buildings shall be separated from such premises and from each other by brick walls and fireproof floors, and shall be enclosed upon one or more sides by external walls.

All openings between such premises and such chambers or buildings shall be fitted with fire-resisting doors as described in No. 21 of these regulations; such doors, however, may be of such greater size as the Council may approve.

Scene stores, &c.

28. All scene stores and property rooms in connection with such premises shall be enclosed by brick walls not less than 9 in. thick, and shall have floors and ceilings of fire-resisting materials.

All openings from such scene stores and property rooms to such premises shall be closed by fire-resisting doors as described in No. 21 of these regulations; such doors may, however, be of such greater size as the Council may approve.

29. All constructional ironwork in such premises shall, if considered necessary, be embedded in fire-resisting materials in a manner to be approved by the Council.

Structural ironwork.

30. No soft wood or other inflammable wall linings, partitions, screens, or barriers shall be used in any part of such premises, and no cavities shall be left behind any linings. All woodwork of the stage shall be rendered non-inflammable or be hard wood.

Non-flammable linings, etc.

31. All skylights and lantern lights in such premises which may be liable to be broken shall be protected by stout galvanised iron-wire guards, securely fixed on the outside of such skylights or lantern lights.

Skylights, etc.

32. All such premises when lighted by gas shall have separate and distinct gas services and meters as follows:—

Gas installations.

(*a.*) To the stage (wherever possible electric light shall be used);

(*b.*) To the auditorium;

(*c.*) To the staircases, corridors, and exits.

Such meters shall be placed in properly ventilated chambers of fireproof construction, the openings to which shall be fitted with fire-resisting doors as described in No. 21 of these regulations.

All gas brackets shall be fixed without joints; and all burners within reach of the audience shall be fitted with secret taps, and shall be efficiently protected by glass or wire globes.

All gas burners within 3 ft. of inflammable ceilings shall be fitted with consumers of uninflammable material to distribute the heat.

All gas pipes shall be made of iron or brass.

Where there is to be a stage or where scenery is to be used, the footlights or floats shall be protected by fixed wire guards.

The rows and lines, and gas burners in the wings (which must commence 4 ft. at least from the level of the stage), shall be protected by fixed iron-wire guards.

All battens shall be hung by at least three wire ropes, and shall be protected at the back by a solid metal guard and wire fixed to a stiff iron frame at such a distance from the gas jets that no part of the scenery or decoration can become heated.

All moveable lights shall be fitted with flexible tubes, and the gas in every case shall be capable of being turned off by the tap on the stage as well as by that on the flexible tube.

All flexible tubes shall be of sufficient strength to resist pressure from without.

An indicating gas plate shall be provided at a convenient place at the side of the stage. A stopcock shall be provided outside such premises in order that the supply of gas may be cut off when necessary.

Oil or candle lamps under certain conditions.

33. Additional means of lighting in such premises for use in the event of the gas or the electric light being extinguished, shall be provided for the auditorium, corridors, passages, exits, and staircases, by a sufficient number of oil or candle lamps, of a pattern to be approved by the Council, properly secured to an uninflammable base, and placed, if possible, out of reach of the public. This shall not apply where there is a complete installation of both gas and electric light, or two complete systems of electric lighting from separate companies.

Such lamps shall be kept alight during the whole time the public are in such premises.

No mineral oils shall be used in such lamps.

Sun burner.

34. If there be a sun burner in such premises, it shall be provided with a pilot light, which shall be placed so that such sun burner can be lighted from the stage.

Ventilation.

35. All parts of such premises shall be properly and sufficiently ventilated in a manner to be approved by the Council.

All openings for ventilation shall be shown on the plans, and described in the specification, which shall be submitted to the Council for its approval.

Water-closets, etc.

36. Each part of all such premises used by the public shall be provided with sufficient and separate water-closet accommodation for the use of males and females, and urinal accommodation for the use of males. Such water-closets and urinals shall be constructed and arranged to the satisfaction of the local sanitary authority.

37. All such premises shall be provided with a sufficient number of hydrants, each of a diameter of not less than 2½ in.; such hydrants shall be connected by, at least, a 3-in. main with a water company's high pressure street main.

Hydrants, etc

Where such premises contain a large superficial area for the accommodation of the public, the size of the main supplying the hydrants shall be determined by the Council. A pressure of at least 30 lbs. on the square inch shall be maintained in the flies and upper tiers of such premises.

Each of such hydrants shall be provided with, at least, a 30-ft. length of hose with fittings of the Metropolitan Fire Brigade pattern, and shall be fitted with bibcocks for filling buckets. Three buckets filled with water shall be kept near each hydrant. Hand pumps or other small fire appliances shall be provided as required.

Where there is no constant supply of water, there shall be provided on the top of the proscenium wall, or at some other place to be approved by the Council, two cisterns, to be kept always filled with water.

Such cisterns shall be each capable of containing at least 250 gallons of water for every 100 persons of the audience to be accommodated in the building, and shall be properly protected from all danger from frost.

Fire mains shall be connected with such cisterns to hydrants to be fixed in such places and in such a manner as may be approved by the Council.

38. Every theatre, and, where considered necessary by the Council, all other premises licensed for public entertainments, shall be connected with the nearest fire brigade station by telephone alarm. The positions for such alarms and the number of points in the house shall be decided upon by the chief officer of the fire brigade. The installation and maintenance shall be carried out by the General Post Office at the cost of the lessee.

Telephonic alarm installation.

39. All woodwork of stage, hangings, curtains, and draperies in such premises shall be rendered non-inflammable.

Hangings, etc., to be non-flammable.

Fire precautions.

40. Blankets or rugs and buckets filled with water shall always be kept on the stage, in the flies, scene-stores, or wings, and in the immediate passages approaching the dressing-rooms of such premises, and attention shall be directed to them by placards legibly printed or painted and fixed immediately above them to the satisfaction of the Council.

Some person shall be held responsible by the management for keeping the blankets or rugs, and fire appliances ready for immediate use.

Hatchets, hooks, and other appliances for taking down hanging scenery in case of fire shall be always kept in readiness for immediate use.

The regulations as to fire shall be posted in some conspicuous place approved by the Council in such premises, so that all persons connected with such premises may be acquainted with such regulations.

Fireplaces and stoves.

41. No fireplace shall be formed in any portion of the auditorium or stage of such premises.

All open fireplaces or stoves in any other part of such premises shall be protected by strong fixed iron-wire guards and fenders of not more than 1½-in. mesh completely enclosing the fire. A part of the guard or fender may be made to open for all necessary purposes.

Electric lighting and heating installations.

42. The electric lighting and heating apparatus shall be carried out to the satisfaction of the Council, and no work shall be commenced until the sanction of the Council has been obtained to what is proposed to be done. Copies of the Council's regulations on the subject can be obtained on application to the Clerk of the Council.

Note by Author.—The latter regulations, under date of 25th March 1902, are not given here in the Appendix, as having but slight bearings on the plans.

Lightning conductor.

43. Such premises shall, where considered necessary by the Council, be provided with a lightning conductor, to the satisfaction of the Council.

44. The Council reserves to itself the right from time to time, in any special case, to modify or dispense with these regulations.

Power to modify or dispense with these regulations.

All applications for dispensation or modification of these regulations shall be made in writing, addressed to the Clerk of the Council, and shall contain a statement of the facts of the particular case, and the reasons why it is desired to modify or dispense with these regulations as applicable.

45. When the premises have been licensed, the person or persons in whose name the license is granted by the Lord Chamberlain or the London County Council shall be held responsible for the due management of such premises, and for the safety of the public and his or their employées in the event of fire.

Responsibility.

46. No subsequent alterations shall be made to such premises without the sanction of the Council having been first obtained.

Additions or alterations to premises.

Notice of any intended structural addition to, or alteration of, any such premises shall be given in writing to the Clerk of the Council, and shall be accompanied by drawings, elevations and sections, block plan, and specification of the works to be executed similar to those required in the case of premises to be certified for the first time by the Council, and shall show such intended addition or alteration.

The Council will, if necessary, cause a fresh survey of such premises to be made.

No doors, bolts or other fastenings, obstructions to the means of egress, flap seats or other means of diminishing or stopping up the gangways, whether permanently or temporarily, shall be permitted.

Note.—The issue of the certificate referred to in these regulations does not preclude the Council from considering, on its merits, any application which may hereafter be made to it with respect to the licensing of the building for public entertainments.

APPENDIX C.

THE BUILDING REGULATIONS.

BEING PRINCIPLES TO BE OBSERVED IN PLANNING AND FITTING UP NEW BUILDINGS FOR PUBLIC ELEMENTARY SCHOOLS, TOGETHER WITH RULES AS TO CONSTRUCTION, AND CERTAIN REQUIREMENTS AS TO PLANS. (*See Article* 17 *of the Code.*) ELEMENTARY EDUCATION ACT, 1870, SECTION 97.—ISSUED BY THE BOARD OF EDUCATION, 1907.

PREFATORY NOTE.

1. *New Buildings.*

The chief aim of these Regulations is to secure that buildings newly erected for use as Public Elementary Schools shall be satisfactory for their special purpose.

Part I. relates to the particular questions which arise in designing a school as a place of instruction, and to the principles on which a building should be arranged and fitted in order to secure conditions favourable to effective teaching.

Part II. relates to the construction of the fabric, to the sanitary and other hygienic conditions, and to the safety of the scholars in case of fire or panic.

Part III. relates to the submission of plans in proper form for consideration by the Board of Education.

Part I. sets forth principles which embody the result of the experience of the Board of Education. These are intended to assist Local Education Authorities, School Managers, and their Architects, in providing schools which shall be compact, properly sub-divided for class teaching, conveniently arranged for effective supervision by the Head Teacher and for the movement of the children from the entrance to the class-rooms or from one class-

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These Regulations are superseded by the new Building Regulations of 1914, which came into force on August 1, 1914. A copy of these will be sent post free to each purchaser of this book on receipt of a postcard addressed to the Publishers.

room to another, and, as regards the several rooms, properly fitted for the instruction to be given in those rooms. These sections have been framed with a view to the combination of economy with efficiency.

Part I. is not meant to restrict liberty of treatment so far as that is consistent with the observance of the Rules in Part II. If therefore a Local Education Authority, or any other body of school promoters, desires to arrange a school on lines which are not entirely in accordance with the principles of school planning as set out in Part I., the Board will be prepared to consider other arrangements of the various parts of the building, provided there is good reason to suppose that an efficient building for teaching purposes will thereby be forthcoming.

The Rules of Part II. deal with the extent of the site, with the solidity of the fabric, with the lighting, warming, drainage, ventilation, cloak-rooms and sanitary arrangements, and with the adequacy of the entrances and staircases in view of the use of the building by a large number of children. These matters have an important bearing on the health and safety of the scholars, and unless there are circumstances of an exceptional nature, no newly erected building which does not conform with the Rules of Part II. will be recognised for use as a Public Elementary School.

2. *Existing Buildings.*

These Regulations do not constitute a standard by which existing premises can be judged ; and they are plainly unsuitable for any rigid application to proposals for enlarging or otherwise improving existing buildings. Such cases must be dealt with individually as they arise, having reasonable regard to the principles set forth in these Regulations.

PART I.

SEC. 1. *General.*—Before an Architect is instructed to prepare plans for a new building for use as a public elementary school, careful consideration should have been given to various points which have an important bearing on the character of the building which is required in the particular case.

The principal factors to be considered are the respective numbers of boys and girls for whom it has been determined that provision is necessary. The distribution of these scholars in respect of age is also very important in its bearing on organisation, and consequently on planning; the type of building required will probably depend to some extent on the manner in which the Local Education Authority have exercised their discretion as to the exclusion of children who are under five years of age; and the nature of the accommodation required in the upper departments of ordinary public elementary schools will be affected if higher elementary schools are provided in the locality.

It must be remembered that a Head Teacher can seldom undertake effectively the responsibility for more than five to six hundred scholars, including the supervision of the teaching staff required for that number. This, therefore, is the greatest number of scholars for whom provision can wisely be made in one and the same department, remembering that each department must have its own Head Teacher, who is responsible for the general control and supervision of the instruction and discipline of that department (Article 8 of the Code).

The number of departments on any one site will depend upon the total number of scholars for whom provision is required, but it will be very seldom that more than three departments (or four, if one of them is for boys and girls of seven to nine or ten years of age) could properly occupy parts of one and the same building. When a school comprising departments for boys, girls, and infants is attended by all the children of the area for which it is available, it is not unusual to find that the average attendance in each department is much the same; and this fact will be a guide in planning a building for these conditions. But it is desirable to have a certain margin of places in the infants' department in order to meet the greater variability of the attendance at different seasons.

All these considerations should be kept in mind in deciding how many places should be provided in the several departments of a large school. But in every case the local circumstances must be carefully considered, and if children under five years of age are excluded, or if many of those who reach the age of twelve years are transferred to schools of a higher grade, or if other special circumstances exist, the proportions above suggested must be considerably modified.

The number and circumstances of the scholars who will attend in each department (if more than one be contemplated), and the number and qualifications of the teaching staff to be employed in each, will determine approximately the grouping of the scholars for teaching, the number of rooms which should be provided in the building, and the number of places in the several rooms. The rooms must be grouped compactly and conveniently so as to secure proper organisation and supervision ; every building intended for use as a public elementary school must be planned so that the children who will attend can be seated in the best manner for being taught. It is important to remember that the number of places provided in any room depends not merely on its area, but also on the lighting, the shape of the room (especially in relation to the kind of desk proposed), and the position of the doors and fireplaces, which should be arranged so as to allow the whole of one side of any room to be left free for the groups of desks.

For large departments containing from 350 to 600 places the most suitable plan is that of a Central Hall with the class rooms grouped round it ; as a rule such a department would require from seven to ten class-rooms. Smaller departments may be planned conveniently with the class-rooms opening from a corridor, and a similar plan may be adopted even for larger departments. For small schools a school-room with one or more class-rooms will be sufficient. There should always be at least one class-room, except in special cases.

Where the site is sufficiently large, open, and fairly level, the most economical plan is that in which all the rooms are on the ground floor, and this arrangement is preferable on educational grounds. It is desirable that a building for use as a public elementary school should be on not more than two floors. A building on three floors is open to many objections, though it may be necessary in special circumstances, as, for example, on a site where land is very costly, or where it is otherwise impossible to get adequate area for playgrounds.

SEC. 2. *Central Halls.*—When there is a Central Hall it should have a floor-space of not more than 4 sq. ft. for each scholar for whom the school is recognised; about 3½ sq. ft. for each scholar will be sufficient. The Hall must be fully lighted, warmed and ventilated.

(*a.*) A single Central Hall may be provided for the joint use, at separate times, of two departments, provided that it is so placed as to be readily accessible from the class-rooms of each department.

(*b.*) Where outdoor space is not available, physical training should be given in the Central Hall (or the Corridor). This purpose should be taken into consideration at the time when the building is planned. Since fixed gymnastic apparatus is unsuitable for children under fourteen years of age, a separate gymnasium is not required, and cannot be approved.

SEC. 3. *Corridors.*—Large schools not built with a Central Hall must be provided with a wide corridor giving access to the rooms; and two or three of the rooms ought to be divided from one another by moveable partitions only, so that on occasions one large room may be available.

A corridor should be fully and directly lighted and ventilated, and from 8 to 12 ft. wide, according to the size of the school.

SEC. 4. *School-rooms.*—Where a school-room is the principal room in a school which has neither Central Hall nor Corridor it should never be designed for more than a hundred children, and a room of even smaller size is desirable. The width should vary according to the kind and arrangement of the desks (Section 6).

No school-room lighted from one side only can be approved. The gable ends should be fully utilised for windows, and there should be no superfluous windows opposite the teacher.

When a school consists of a single room, that room should not contain more than 600 sq. ft. of floor-space.

SEC. 5. *Class-rooms.*—The number of class rooms should be sufficient for the size and circumstances of the school.

(*a.*) The class-rooms should not be passage-rooms from one part of the building to another, nor from the school-rooms to the playground or yard. Both school-rooms and class-rooms must have independent entrances. The rooms should be arranged so that each can be easily cleared without disturbing the work proceeding in any other room.

(*b.*) A class-room should not be planned to accommodate more than from fifty to sixty children; but in special cases somewhat larger rooms may be approved. In the absence of supplementary light the measurement from the window-wall in a room 14 ft. high should not exceed 24 ft. 8 in. Except in very small schools class-rooms should not be planned for less than twenty-four scholars.

(*c.*) The proportions of class-rooms should vary with the kind and arrangement of the desks; but a long and narrow room should always be avoided, and a room approximating to a square is most satisfactory.

SEC. 6. *Desks.*—Seats and desks should be provided for all the children, graduated according to their ages, and placed at right angles to the window-wall. (*See also* Section 4 and Rule 6, Part II.) The seats should be fitted with backs.

An allowance of 18 in. per scholar at each desk and seat will suffice (except in the case of the dual desk), and the length of each group should therefore be some multiple of 18 in., with gangways of 18 in. between the groups and at the walls. In the case of the dual desk the usual length is 3 ft. 4 in., and the gangways 1 ft. 4 in.

(*a.*) In an ordinary class-room five rows of long desks or six rows of dual desks are best; but in a school-room or room providing for more than sixty children, there should not be more than four rows of long desks or five rows of dual desks.

If a school-room is 18 ft. wide, three rows of long desks or four of dual desks may be used; if the width is 22 ft., the rows may be four and five respectively.

Long desks should be so arranged that the teacher can pass between the rows. Where dual desks are used this is not necessary, as the gangways give sufficient access; but the teacher should be able to pass behind the back row.

(*b.*) The desks should be very slightly inclined. An angle of 15° is sufficient. The objection to the flat desk is that it has a tendency to make the children stoop. A raised ledge in front of a desk interferes with the arm in writing. The edge of the desk when used for writing should be vertically over the edge of the seat.

(*c.*) Single desks are not necessary in an ordinary public elementary school.

SEC. 7. *Accommodation.*—The accommodation of the school, *i.e.*, the number of places for which the school is finally recognised, will depend in part on the arrangement of the desks, which must be approved by the Board. (*See* Section 6, Part I. of these Regulations and Article 17 (*c*) of the Code.)

No Central Hall or corridor, and no class-room for cookery, laundry work, handicraft, drawing or science, will be counted towards the accommodation.

When the building to be erected is for the use of older scholars, the plans of the school-room (if any) and class-rooms must show an average of not less than 10 sq. ft. of floor-space for each place proposed to be provided.

SEC. 8. *Infants' Schools.*—Infants should not, except in very small schools, be taught in the same room with older children, as the methods of instruction suitable for infants necessarily disturb the discipline, and instruction of the other scholars.

Access to the infants' room should never be through the older children's school-room.

(*a.*) It is desirable that the partition between an infants' room and any other school-room or class-room should be impervious to sound, and there should be no habitual means of direct communication other than an ordinary door.

(*b.*) An infants' school and playground should always be on the ground floor.

(*c.*) No infants' class-room should accommodate, as a rule, more than 60 infants.

(*d.*) A space in which the children can march and exercise should be provided. A corridor intended for this purpose should not be less that 12 ft. wide.

(*e.*) The babies' room should always have an open fire, and should be maintained at a temperature of not less than 60 degrees.

(*f.*) In infants' schools an allowance of 16 in. per child at long desks will be sufficient. Dual desks should be 3 ft. long.

(*g.*) The accommodation of the school, *i.e.*, the number of places for which the school is finally recognised, will depend in part on the arrangement of the desks which must be approved by the Board. [*See* Section 6 and Article 17 (*c.*) of the Code.]

No Central Hall or corridor will be counted towards the accommodation.

When the building to be erected is wholly for the use of infants, the plans of the school-room (if any) and class-rooms must show an average of not less than 9 sq. ft. for each place proposed to be provided.

(*h.*) Where an infants' class-room is attached to a school for older children, and there is no corridor or Hall available, it is desirable that the class-room should have a larger floor space than 9 sq. ft. per child, and that provision should be made of sufficient space, free of desks, for exercise. This space should extend across the room, and be not less than 12 ft. wide.

SEC. 9. *Rooms for Cookery, Handicraft, &c.*—As a rule a single room for cookery, or laundry work, or handicraft, or science, or drawing, will serve for more than one school if provided as a Centre in a convenient position. Centres for cookery and laundry work should have their own lavatory and cloakroom. Lavatory basins and hat pegs should be provided also for handicraft centres.

Large schools, or schools of an exceptional type, may sometimes require special rooms for their exclusive use.

(*a.*) *Cookery Centres.*

A Cookery Centre should be capable of accommodating 12 to 18 at practical work. Provision for instruction in Scullery work is necessary.

The sink should be placed in full view of the teacher and children, and should be fitted with a cold water supply and a waste pipe.

The floor space for practical work should afford about 25 sq. ft. for each scholar, and should not be encumbered with desks, cupboards, or stoves.

The range should be so placed that it is in a good light and has ample space in front in which to group the class.

In cookery rooms the ventilation needs special arrangements. Where a gas stove is used, it may be necessary to have a pipe fixed to carry off noxious fumes. The temperature should not be allowed to rise above 70 degrees.

The apparatus for lessons in cookery should include such stoves and other appliances as are usually found in the homes of the children. The stoves and appliances must be sufficient in number and size for the scholars to be taught in a practice lesson.

(*b.*) *Laundry Centres.*

A Laundry Centre should be of simple construction, and entirely apart from the ordinary school buildings.

A laundry should provide not less than 25 sq. ft. per head.

Laundry tables should be large enough to allow at least 3 ft. of space for each child when ironing.

The ventilation of rooms for laundry work needs special arrangements for the removal of steam.

(*c.*) *Handicraft.*

In its plan, arrangements, construction, lighting and ventilation, a room for teaching handicraft should be modelled on a workshop rather than on a school. The construction should accordingly be simple. The roof may be either of lean-to or other ordinary form, according to circumstances. Its height at the windows in front of the benches need not be more than 10 ft. The light must be ample. The temperature should not be so high as in an ordinary class-room. A flat ceiling is not, as a rule, necessary. Ample ventilation should be provided by inlets at a height of 5 ft. from the floor, and by outlets at the highest point. A room for 20 scholars should have a floor-space of about 700 sq. ft.

(*d.*) *Science-room.*

With the sanction of the Board a room for elementary practical work in science may be provided for the use of one large or several contributory schools. Such a science-room, if approved, should not, as a rule, contain more than 600 sq. ft. of floor space. It should be suitably fitted for the instruction to be given in it, and, where necessary, a fume closet may be provided.

In addition to a science-room, one of the ordinary class-rooms may be fitted with a simple and suitably equipped demonstration table. But a special lecture-room is not necessary in an ordinary public elementary school.

(*e.*) *Drawing class-rooms.*

A Drawing class-room can be sanctioned only if it is likely to be used for a reasonable time every week by the scholars from one large or several contributory schools. A suitable size for such a room is 600 sq. ft. of floor space. Light should be admitted at a suitable height and angle from the North, North-East, or East.

SEC. 10. *Higher Elementary Schools.*—A Higher Elementary School should in general be planned in accordance with the principles applicable to an ordinary Public Elementary School, but it is important that the curriculum of the school should have been determined, and that it should have been generally approved by the Board, before an architect is instructed. Attention is directed to the following points of importance:—

1. For a Higher Elementary School accommodating from 300 to 350 scholars, 8 to 10 class-rooms will generally be required, since every class should have its own class-room. No class-room should accommodate more than 40 scholars. No Central Hall or corridor, and no class-room for cookery, laundry work, handicraft, drawing, or science, will be counted towards the accommodation.

   (*a.*) The class-rooms may be furnished with single or dual desks as may be desired. If single desks are adopted, a class-room should have an area of about 15 sq. ft. per scholar. Class-rooms fitted with dual desks need not be so large, but a minimum of about 12 sq. ft. per scholar will be requisite.

2. There must be available for use by the scholars of a Higher Elementary School special rooms of suitable size and proper equipment, if any such are required, for giving the instruction which is provided in the approved curriculum. If special rooms are otherwise available, they need not be provided in the building of the Higher Elementary School; but if special instruction is to be given elsewhere than in the building occupied by the Higher Elementary School, full information must be furnished, when the plans are submitted, showing that the needs of the scholars will be properly met.

   (*a.*) If cookery, laundry work, or handicraft is to be taught in the school building, the room in which each is to be taught should be provided in accordance with Section 9.

   (*b.*) If advanced drawing is taught in the school a drawing class-room is desirable. It should provide 30 sq. ft. of floor-space for each scholar who will be taught in it at any one time. If the school has a suitably lighted Central Hall, this would answer for a drawing class-room, but no class other than a drawing class should be taught in a Central Hall.

(*c.*) (i.) A laboratory, if included in the building, should afford 30 sq. ft. of floor-space for each scholar who will be instructed in it at any one time.

(ii.) A laboratory must have suitable tables. These should be well lighted, and should be fitted as required for the experimental work included in the approved curriculum. If chemistry is taught the laboratory should have sinks, cupboards and the necessary fume closets.

(*d.*) (i.) If there is a separate lecture-room it should be fitted with a suitably furnished demonstration table. If chemistry is to be taught the lecture-room, if any, should have a fume closet.

(ii.) If chemistry or physics is taught and there is no separate lecture-room, one or more of the class-rooms may have a suitable demonstration table, and a fume closet if chemistry be taught.

(iii.) A small preparation room may be provided near the lecture-room, or other room used for the purpose, in schools where Science is taught.

SEC. 11. *Teachers' Rooms.*—In large schools there should be provided for the use of the teachers a small room or rooms with suitable lavatory accommodation. A store-room for books and other school material should adjoin the teachers' room.

SEC. 12. *Teachers' House.*—The residence (if any be provided) for the master or mistress should contain a parlour, a kitchen, a scullery and three bedrooms, and the smallest dimensions which the Board can approve are :—

For the parlour - -	14 ft. by 12 ft.	of superficial area	9 ft. in height to wall-plate.
,, the kitchen - -	12 ft. by 12 ft.		9 ft.
,, one of the bedrooms	14 ft. by 12 ft.		8 ft. if ceiled at wall-plate; or 7 ft. to wall-plate, and 9 ft. to ceiling.
,, two other bedrooms -	12 ft. by 8 ft.		

(*a.*) The residence must be so planned that no room is a passage-room, and that the chimneys are not all on the external walls.

(*b.*) There must be no internal communication between the residence and the school.

(*c.*) Windows should be carried up as nearly to the ceiling as practicable.

(*d.*) There must be a separate and distinct yard with offices.

(*e.*) No dwelling-house should be built as part of the schoolhouse.

PART II.

RULE 1.

Sites and Playgrounds.—In planning a school care must be taken to secure that there shall be an open airy playground proportioned to the size and needs of the school, and the site should, if possible, have a building frontage suitable to its area. As far as the site permits the building should not be placed near to a noisy street or main thoroughfare; where this is unavoidable the class-rooms should be placed on the opposite side to the street. A site open to the sun is especially valuable for the children, and important in its effects on ventilation and health, and the class-rooms should be so arranged as to ensure the admission of direct sunlight during some part of the day. The minimum size of site is, in the absence of exceptional circumstances, a quarter of an acre for every 250 children, irrespective of the space required for a teacher's or caretaker's house, or for a Cookery or other Centre. If the school is of more than one storey this area may be proportionately reduced; but a minimum unbuilt-on or open space of 30 sq. ft. per child should be preserved.

(*a.*) Except in the case of very small schools, playgrounds should be separate for boys and girls, and should, where practicable, have separate entrances from the road or street.

(*b.*) All playgrounds should be fairly square, properly levelled, drained, and enclosed. A portion should be covered, having one side against the boundary wall. A covered-way should never connect the offices with the main building; buttresses, corners, and recesses should be avoided.

(*c.*) An infants' school should have its playground on the same level as the school, and a sunny aspect is of special importance.

RULE 2.

Walls, Floors, and Roofs.—The walls of every room used for teaching, if ceiled at the level of the wall-plate, must be at least 12 ft. high from the level of the floor to the ceiling; if the area of the room exceeds 360 sq. ft., the height must be not less than 13 ft., and if it exceed 600 sq. ft. then the height must be at least 14 ft.

(*a.*) The walls of every room used for teaching, if ceiled to the rafters and collar beam, must be at least 11 ft. high from the floor to the wall-plate, and at least 14 ft. to the ceiling across the collar beam.

(*b.*) Great care should be taken to render the roofs impervious to cold and heat.

(*c.*) Roofs open to the apex are very undesirable. They can be permitted only where the roofs are specially impervious to heat and cold, and where apex-ventilation is provided. Iron tie-rods are least unsightly when placed horizontally.

(*d.*) In the case of a school of more than one storey especial care must be taken to render the floors as far as possible sound-proof.

(*e.*) The whole of the external walls of the school and residence (if any) should be solid. If of brick, the thickness must be at least one brick and a half; and if of stone, at least 20 in.; where hollow walls are proposed, one wall must be 9 in. thick and the cavity 2 in.

(*f.*) The Board are only prepared to sanction the erection of schools of a lighter construction, *e.g.*, in iron and wood, or other suitable material, in very special circumstances, as for example in colliery districts where, owing to mining operations, there is no site available upon which a building of the ordinary solid type can be safely erected; or where the population is not of a stationary character, as, for example, during the progress of a large piece of engineering work, or in the neighbourhood of a mine likely to be soon worked out; or where temporary accommodation is required during the building of a new school, or the reconstruction of an old one.

Where such buildings are proposed special care must be taken to ensure the comfort of the children with regard to warmth and ventilation.

(*g.*) All walls, not excepting fence walls, should have a damp-proof course just above the ground line.

(*h.*) The vegetable soil within the area of the building should be removed, the whole space covered by a layer of concrete not less than 6 in. thick, and air bricks inserted in *opposite* walls to ensure a through current of air under floors for ventilation to joists.

(*i.*) Timber should be protected from the mortar and cement by asphalt or tar.

Rule 3.

Entrances.—Entrances should be separate for each department and each sex. In large schools more than one entrance to each department is desirable. (*See also* Rule 4.) Entrance doors should open outwards as well as inwards. A porch should be external to the school-room. An external door, having outside steps, requires a landing between the door and the threshold.

Rule 4.

Staircases.—There must be separate staircases for boys and girls and each department should have its own staircases.

Every staircase must be fire-proof, and external to the halls corridors, or rooms. Triangular steps or "winders" must not be used. Each step should be about 13 in. broad and not more than 5½ in. to 6 in. high. The flights should be short, and the landings unbroken by steps. The number of staircases must be sufficient not only for daily use, but also for rapid exit in case of fire or panic. For any upper floor accommodating more than 250 a second staircase is essential.

RULE 5.

Cloak-rooms and Lavatories.—Cloak-rooms should not be passages, and should be external to the school-rooms and class-rooms. Cloak-rooms should be amply lighted from the end, and should not be placed against the gable wall which should be fully utilised for windows giving light to the rooms used for teaching. (*See* Section 4, Part I.) There should be separate ingress and egress so that the children can enter and leave the cloak-room without confusion or crowding. There should be gangways at least 4 ft. wide between the hanging-rails. Hat pegs should be 12 in. apart, numbered, and of two tiers. The lineal hanging space necessary to provide a separate peg for each child is thus 6 in. The hat pegs should not be directly one above the other.

Cloak-rooms should be fitted with doors so that when desirable they can be locked up.

Thorough ventilation and disconnection are essential, so that smells are not carried into the school. Ample space is needed immediately outside a cloak-room.

Lavatory basins are needed. [*See* Rule 9 (*g*.).] Girls' schools require a larger number than boys' or infants'.

A lock-up slop sink, water-tap, and cupboard are desirable for the caretaker.

RULE 6.

Lighting.—Every part and corner of a school should be well lighted. The light should as far as possible, and especially in class-rooms, be admitted from the left side of the scholars. [This rule will be found greatly to influence the planning. *See*

Rules 6 (*b.*) and 7 (*a.*) and Section 4, Part I.] All other windows in class-rooms should be regarded as supplementary or for ventilation. Where left light is impossible, right light is next best. Windows full in the eyes of scholars cannot be approved. Unless the top of the windows be more than 14 ft. above the floor the plan should show no space more than 24 ft. from the window-wall in any room used for teaching. [*See* Section 5 (*b.*), Part I.]

(*a.*) Windows should never be provided for the sake merely of external effect. All kinds of glazing which diminish the light and are troublesome to keep clean and in repair must be avoided. A large portion of each window should be made to open for ventilation and for cleaning.

(*b.*) The sills of the main lighting windows should be placed not more than 4 ft. above the floor; the tops of the windows should as a rule reach nearly to the ceiling; the upper portion should be made to swing. The ordinary rules respecting hospitals should here be remembered. Large spaces between the window heads and ceiling are productive of foul rooms.

(*c.*) Skylights are objectionable. They cannot be approved in school-rooms or class-rooms. They will only be allowed in Central Halls having ridge or apex ventilation.

(*d.*) The colouring of the walls and ceilings and of all fittings in the rooms should be carefully considered as affecting the light. This point and the size and position of the windows are especially important in their bearing on the eyesight of the children.

(*e.*) The windows should be properly distributed over the walls of the class-rooms so that every desk shall be sufficiently lighted. The glass line of the window furthest from the teacher should be on a line with the back of the last row of desks.

RULE 7.

Ventilation.—The chief point in all ventilation is to prevent stagnant air; particular expedients are only subsidiary to this main principle.

There must be ample provision for the continuous inflow of fresh air, and also for the outflow of foul air. The best way of providing the latter is to build to each room a separate air chimney carried up in the same stack with smoke flues. An outlet should be by a warm flue or exhaust, otherwise it will frequently act as a cold inlet. Inlets are best placed in corners of rooms furthest from doors and fireplaces, and should be arranged to discharge upwards into the room. Gratings in floors should never be provided. Outlets in ceilings must not open into a false roof but must be properly connected with some form of extract ventilator.

The size of the inlets and outlets must be carefully adapted to the method of ventilation proposed. A much larger area is required when no motive force is provided.

It is as well that the windows should have both the top and bottom panes arranged to open inwards as hoppers.

Besides being continuously ventilated by the means above described, rooms should as often as possible be flushed with fresh air admitted through open windows and doors. Sunshine is of particular importance in its effects on ventilation and also on the health of children.

(*a.*) Although lighting from the left hand is considered so important, ventilation demands also the provision of a small swing window as far from the lighting as possible, and near the ceiling.

RULE 8.

Warming.—The heat should be moderate and evenly distributed, so as to maintain a temperature of from 56 degrees to 60 degrees. When a corridor or lobby is warmed, the rooms are more evenly dealt with and are less liable to cold draughts. Where schools are wholly warmed by hot water, the principle of direct radiation is recommended. In such cases open fireplaces in addition are useful for extra warming on occasions, and their flues for ventilation always.

(*a.*) A common stove, with a pipe through the wall or roof, can under no circumstances be allowed. Stoves are only approved when—

- (i.) provided with proper chimneys (as in the case of open fires);
- (ii.) of such a pattern that they cannot become red hot, or otherwise contaminate the air;
- (iii.) supplied with fresh air, direct from the outside, by a flue of not less than 72 in. superficial; and
- (iv.) not of such a size or shape as to interfere with the floor space necessary for teaching purposes.

(*b.*) A thermometer should always be kept hung up in each room.

(*c.*) Fireplaces and stoves should be protected by fireguards.

(*d.*) If a room is warmed by an open fire the fireplace should be placed, if possible, in the corner of the room in order to leave space for the teacher's desk and black-board.

RULE 9.

Sanitary Arrangements. — Water-closets within the main school building are not desirable, and are only required for women teachers. All others should be at a short distance and completely disconnected from the school. Privies should be fully 20 ft. distant.

(*a.*) The latrines and the approaches to them must be wholly separate for boys and girls. In the case of a mixed school this rule especially affects the planning. Boys and girls should not use the same passages or corridors; where such an arrangement is unavoidable, there must be complete supervision from the class-rooms by sheets of clear glass.

(*b.*) Each closet must be not less in the clear than 2 ft. 3 in. wide, nor more than 3 ft., fully lighted and ventilated, and supplied with a door. The doors should be at least 3 in. short at the bottom and at least 6 in. short at the top. More than one seat is not allowed in any closet.

(*c.*) The children must not be obliged to pass in front of the teacher's residence in order to reach their latrines.

(*d.*) The following table shows approximately the number of closets needed :—

	For Girls.	For Boys.	For Infants.	For Girls and Infants.
Under 30 children	2	1	2	2
,, 50 ,,	3	2	3	3
,, 70 ,,	4	2	3	4
,, 100 ,,	5	3	4	5
,, 150 ,,	6	3	5	6
,, 200 ,,	8	4	6	7
,, 300 ,,	12	5	8	8

There should be urinals in the proportion of 10 ft. per 100 boys; urinals are required for infant boys. If the numbers in the school are not very large, offices common to girls and infants can be approved; a proper proportion of the closets must then be made of a suitable height for infants.

(*e.*) Earth or ash closets of an approved type may be employed in rural districts, but drains for the disposal of slop and surface water are necessary. Cesspits and privies should only be used where unavoidable, and should be at a distance of at least 20 ft. from the school. [" Building form A," which may be obtained on application, gives suggestions as to their construction and arrangement.]

(*f.*) Soil-drains must always be laid outside the building (on a hard even bottom of concrete) in straight lines with glazed stoneware pipes, carefully jointed in cement and made absolutely water-tight. A diameter of 4 in. is sufficient except for drains receiving the discharge of more than ten closets, when the diameter should be 6 in. The fall should never be less than 1 in 30 for 4-in., and 1 in 40 for 6-in. drains. An inspection opening or chamber should be provided at each change of direction, so as to facilitate cleansing the drain without opening the ground. Every soil-drain must be disconnected from the main sewer by a properly constructed trap placed on the line of drain between the latrines and the public sewer. This trap must be thoroughly ventilated by at least two untrapped openings; one being the 4-in. soil-pipe carried up full size above the roof, and the other an inlet pipe connected with the side of the trap furthest from the public sewer. Automatic flushing tanks are desirable where trough closets are used.

(*g.*) Waste pipes from sinks or lavatories should be first trapped inside and then made to discharge direct through an outer wall over a trapped gully.

RULE 10.

Water Supply.—In all schools adequate and wholesome drinking water must be available for the scholars.

In cases where it is not taken from the mains of an Authority or Company authorised to supply water, care must be taken to ascertain that the water proposed to be used is adequate in quantity, is of suitable character, and is not liable to pollution in any way, as, *e.g.*, by surface drainage, or by leakage from sewers, drains, cesspools, or other receptacles.

Where water pipes are used they should be so laid or fixed as to be properly protected from frost, and so that in the event of their becoming unsound the water conveyed in such pipes will not be liable to become fouled, or to escape without observation.

There should be no direct communication between any pipe or cistern from which water is drawn for domestic purposes, and any water-closet or urinal.

All water-closets and urinals should be provided with proper service cisterns, which, together with the outlet therefrom, should be capable of providing a sufficient flush.

Any cistern to be used for the storage of water should be water-tight and be properly covered and ventilated, and should be placed in such a position that the interior thereof may be readily inspected and cleansed.

PART III.

SUBMISSION OF PLANS.

Before recognising newly erected premises as suitable for a Public Elementary School the Board must be satisfied by the submission of plans, drawn in accordance with the prescribed requirements, that the Building Regulations are complied with. —(Article 17 of the Code.)

N.B.—The promoters of schools must take their own measures to secure that their plans are in order under any Bye-laws which may be in force in the district in which the school is situated.

Plans relating to Public Elementary Schools, and correspondence on such plans, should invariably be addressed to the Secretary, Board of Education, Whitehall, London, S.W., and not to any officer of the Board by name.

Plans must, except in special circumstances, be submitted to the Board through the Local Education Authority, unless that Authority has approved the direct submission of plans to the Board by an architect or by the managers. In such cases the covering letter should refer to the direction or approval of the Local Education Authority, and failing this the Board may decline to consider the plans.

REQUIREMENTS.

(*All plans, whether for new buildings or for improvements to existing buildings, must be submitted in accordance with the requirements which follow; plans which do not fully comply with these requirements cannot be considered.*)

I. A block plan of the site, drawn in ink to a scale of 20 ft. to an inch. This plan must indicate :—

(*a.*) The position of the school buildings.
(*b.*) Out-buildings.
(*c.*) Playground.
(*d.*) Drains (collateral and main), with their fall and depth below ground.
(*e.*) Entrances.
(*f.*) Boundary walls, or fences, and their nature.
(*g.*) Roads.
(*h.*) The points of the compass.
(*i.*) The levels of the ground at the principal points.

N.B.—For approval of the site alone, the plan should show (*g.*), (*h.*), and (*i.*).

II. A plan of each floor of the School-rooms (and Teacher's or Caretaker's house if any) drawn in ink to a scale of 8 ft. to an inch. The internal fittings of the rooms (*fireplaces, groups of desks, &c.*) must be accurately shown. The plan should also state whether the rooms are intended for boys, girls, or infants.

In cases of enlargement, a plan showing the buildings as they exist is needed.

III. Sections and at least four elevations, also drawn in ink to a scale of 8 ft. to an inch. The ceiling, the positions of window-heads in relation thereto, and the mode of ventilation must be shown.

N.B.—(*a.*) Pencil drawings cannot be received, but sketch plans or coloured tracings in ink on tracing-cloth may be submitted while plans are in the preliminary stage of pencil, so that suggested alterations can be adopted without difficulty or expense. Such plans may be drawn to a scale of 16 ft. to one inch. The Board's final approval will not in any case be given to preliminary plans, and the full plans described above will always be required.

(*b.*) Diagrams are of no value and cannot be accepted.

(*c.*) In the case of enlargements or alterations the whole site and the existing building should be as accurately shown in every respect as the proposed changes, and in such a manner that any change of numbers can be ascertained.

(*d.*) All plans should be dated, the scales drawn on and dimensions figured.

(*e.*) It is preferable that all plans should be submitted on linen tracing-paper or other material which can be folded,

IV. A section of the desk proposed to be used, drawn to a scale of 1½ in. to a foot. (See Section 6, Part I.)

V. A draft specification.

VI. An approximate estimate of the total expenditure proposed.

PART IV.

CONDITIONS OF RECOGNITION OF NEW BUILDINGS.

A newly erected building for which plans have not been approved or conditionally approved by the Board of Education before 1st October 1905, will not be recognised for use as a Public Elementary School, unless it is shown, by plans submitted in accordance with the requirements of Part III. of these Regulations, that the Rules of Part II. will be observed. In exceptional cases, where special circumstances exist, the Rules of Part II. may be waived by the Board in some particulars. On any question arising under these Regulations the decision of the Board is final.

Newly erected buildings, unless for good reason, should be planned in accordance with the principles set out in the several sections of Part I., and the Board may refuse to recognise a school if, in their opinion, these principles have been unnecessarily departed from.

APPENDIX D.

BUILDING REGULATIONS FOR SECONDARY SCHOOLS AND PUPIL-TEACHER CENTRES.

BEING PRINCIPLES TO BE OBSERVED IN DESIGNING AND FITTING UP NEW BUILDINGS, RULES AS TO CONSTRUCTION, &C., AND CERTAIN REQUIREMENTS AS TO PLANS, SPECIFICATIONS, AND ESTIMATES.

Issued by the Board of Education, 1907.

NOTE.

(1.) Plans relating to *Secondary Schools* in Wales and Monmouthshire, and correspondence on such plans, should be addressed to The Secretary, Welsh Department, Board of Education, London, S.W. (Telegraphic address:—"Principality, London.")

(2.) Plans relating to *Welsh Intermediate Schools* should be submitted to the Board of Education by the Local Governors, through the Local Education Authority.

PREFATORY NOTE.

(1.) *New Buildings.*

The chief aim of these Regulations is to secure that buildings newly erected for use as Secondary Schools shall be satisfactory for their special purpose. For the purposes of the Regulations, Pupil-Teacher Centres are to be considered as Secondary Schools; and the Regulations will be held to apply to them, subject to such modifications as may appear necessary.

Part I. relates to the particular questions which arise in designing a school as a place of instruction, and to the principles

These Regulations are superseded by the new Building Regulations of 1914, which came into force on August 1, 1914. A copy of these will be sent post free to each purchaser of this book on receipt of a postcard addressed to the Publishers.

on which a building should be arranged and fitted in order to secure conditions favourable to effective teaching.

Part II. relates to the construction of the fabric, to the sanitary and other hygienic conditions, and to the safety of the scholars in case of fire or panic.

Part III. relates to the submission of plans in proper form for consideration by the Board of Education.

The principles which are set out in Part I. are intended to assist Local Education Authorities, Governing Bodies, and Architects to provide premises which shall be compact, properly subdivided for class teaching, well arranged for effective oversight by the Headmaster or Headmistress and for the movement of the scholars from one part of the school to another or from the entrance to the several class-rooms, &c., and, as regards the several rooms themselves, properly fitted for the instruction to be given in those rooms. The Board, however, recognise that, owing to the wide differences between the various grades and kinds of Secondary Schools and Pupil-Teacher Centres, it is undesirable to attempt to lay down any hard and fast rules as to the actual method of planning to be adopted except on points of fundamental importance. Any variations from the principles here suggested will be carefully considered with regard to the particular purposes which the building is intended to serve, and will be approved if they can be shown to provide satisfactorily and effectively for the educational and other needs of the scholars.

For this purpose the Board will be prepared to report upon, and discuss with the promoters, schemes for new buildings for Secondary Schools while in a preliminary stage in any case where such a course seems advisable.

The Rules of Part II. deal with the extent of the site, with the solidity of the fabric, with the lighting, warming, drainage, ventilation, cloak-rooms and sanitary arrangements, and with the adequacy of the entrances and staircases in view of the use of the building by a large number of scholars. These matters have an important bearing on the health and safety of the scholars, and, unless there are circumstances of an exceptional nature, no newly erected building which does not conform with the Rules of Part II. will be recognised for use as a Secondary School.

(2.) *Existing Buildings.*

These Regulations do not constitute a standard by which existing premises can be judged; and they are plainly unsuitable for any rigid application to proposals for enlarging or otherwise improving existing buildings. Such cases must be dealt with individually as they arise, with reasonable regard to the principles set forth in these Regulations.

PART I.

SEC. 1. *General.*—Before any instructions are given to an Architect to prepare plans for a new building careful consideration should be given to the proposed organisation of the school; the number of masters or mistresses to be employed; the probable size of the classes in the different parts of the school; the relative importance of the teaching of science, art, or manual work; the possibility of grouping sets of rooms conveniently for certain branches of the work, &c., so that the plan of the building may be fully adapted to the work to be done in the school.

It is important to remember that as the actual numbers in a class can seldom be made to correspond closely with the various sizes of rooms provided, the nominal accommodation as shown by the plans should exceed the number for which the school is intended to provide. The custom of dividing up classes for different subjects again makes the provision of extra small class or division rooms desirable.

The rooms should be grouped compactly and conveniently in order to secure easy and effective supervision and economy in working and maintenance. Generally speaking, in the case of schools where the number of scholars is considerable, this result can most satisfactorily be secured by placing the class-rooms on three sides of, and opening from, a Central Hall. In the case, however, of small schools and those in which the Hall is made to serve a variety of purposes, it is often found more convenient to separate the class-rooms from the Hall in order to avoid disturbance.

Where more than one floor is necessary the upper rooms can be entered from a gallery which should be in full view of the Hall. As far as possible, passages and corridors should be avoided ; if used, they must be large, airy, and well lighted.

The class-rooms should have the upper panels of the doors glazed with clear glass, in order to facilitate inspection without disturbing the work in the room.

The accommodation of a room depends not merely on its area, but also on the lighting, position of the doors and fireplaces, and the general shape of the room.

SEC. 2. *Assembly Hall.*—The Central (or Assembly) Hall should have a floor-space of at least 6 sq. ft. for each scholar for whom the school is to provide accommodation, and it is preferable that if the school be for less than 150 scholars a floor-space of 8 sq. ft. per scholar should be provided.

Where no Hall is provided there must be a large well-lighted corridor giving access to the various rooms; this must be not less than 8 ft. wide in the case of small schools, the width being increased with the size of the school. In these cases it is advisable that two adjacent class-rooms should be so arranged that they can be thrown together to form a large room when required.

The Central (or Assembly) Hall should not be used as a class-room, except for drawing. If it is found necessary to use the Hall as a class-room, it must never be used for more than one class at once. A Central Hall occasionally used as a class-room will not be counted in the accommodation for which the school is recognised.

SEC. 3. *Class-rooms.*—In every school there must be class-rooms at the rate of four for every 100 scholars. There must be in the class-rooms, as distinct from the laboratories and other rooms, sufficient accommodation for the whole number of scholars for whom the school is intended to provide. A lecture-room, however, if suitable for class teaching, may be counted as a class-room for not more than 30 scholars. No class-room should be designed for more than 30 or less than 15 scholars. Class-rooms should be fitted with single desks, having gangways of not less than 18 in. between the rows and between the desks and the wall on each side, 1 ft. between the last row of desks and the back wall, and a clear space extending the full width of the room of not less than 7 ft. 6 in. between the front row of desks and the wall for the teacher. The desks may be reckoned as occupying a space of about 3 ft. by 2 ft. in order to provide the requisite distance between the front of one and the back of that next in front of it.

To provide for this a floor area of from 17 to 18 sq. ft. per head will be required according to the size of the class.

In cases where it is found difficult to provide this amount the Board will be prepared to accept a minimum allowance of 16 sq. ft. per head, provided that the arrangement can be shown to be satisfactory. In this case the desks should be placed closer together in pairs, with a gangway of not less than 2 ft. between the double rows of desks. (For rules as to lighting, *see* Part II. Rule 6.)

Where fireplaces are provided they should be placed in the outer corner of the room, in order to avoid interference with the master's platform and blackboard.

Stepped seating should not be used.

SEC. 4. *Lecture-room.*—A lecture-room should accommodate not less than 30 scholars, and may be large enough to hold more; it should be constructed as far as possible on the principle of a theatre with rising seats. There must be a floor-space of not less than 14 sq. ft. per scholar for the first 30 scholars, and 12 sq. ft. for each scholar above that number.

Windows must not be placed facing either the teachers or scholars.

SEC. 5. *Laboratories and Science Lecture-room.*—In every school there must be one or more laboratories, and there should be a science lecture-room, or a class-room fitted for experimental demonstration. A laboratory should accommodate not less than 15 nor more than 25 scholars at a time at practical work, but in schools of more than 200 may accommodate more, if arrangements are made for supervision by more than one teacher at a time.

Thirty sq. ft. of floor space are necessary for each scholar for whom provision is made in a laboratory.

> Laboratories should be thoroughly well lighted and properly fitted with benches for their special purpose, whether chemical, physical, or biological, and supplied with water, gas, and, where possible, electric current. In a chemical laboratory there must be special provision, by way of fume closets, a hood over a bench, or otherwise, for experimental work involving noxious fumes. A physical laboratory should be free from vibration, and for that purpose placed on the ground floor, where possible, and should be capable of being darkened. If there is no balance-room a separate place in the laboratory should be assigned for balances. If on an upper storey, the floor should be free from vibration and impervious to sound. Store, preparation, balance, and dark rooms should be provided where possible.

SEC. 6. *Drawing or Art Rooms.*—In every school there should be a room (or rooms) properly constructed and fitted for the study of drawing or art, with accommodation for at least 15 elementary and 15 advanced students. It is preferable, but not essential, that there should be a separate room for advanced drawing and art. If the school is of more than one storey such rooms must be at the top.

Thirty sq. ft. of floor space are necessary for each scholar for whom provision is made in a drawing or art room.

The following dimensions will afford suitable provision for 50 scholars:—

(*a.*) One room for elementary drawing, 25 ft. by 30 ft. It may be lighted by skylights as well as side windows.

(*b.*) One room for advanced drawing and art, not less than 25 ft. by 30 ft. This room should be lighted from the

North side by a single large window square at the top, to give as much light as possible. The window may be carried up in a dormer if necessary, and its top should be at a height from the floor equal to three-quarters the depth of the room.

The following equipment and apparatus should be provided:—

(*a.*) A sufficient number of single desks, with wire or other receptacles for holding pots or glasses of water, and moveable appliances for the support of drawing-copies.

(*b.*) A suitable boarded or other surface fitted round the walls at a convenient height for blackboard practice.

(*c.*) A rack with numbered compartments for drawing-boards.

(*d.*) Stands for displaying casts and drawing-models or objects.

(*e.*) A cupboard for storing examples and exercises.

(*f.*) A moveable blackboard and a whiteboard with all requisites for demonstrations by teachers.

(*g.*) Some frames, glazed and with moveable backs, for displaying examples of good art work.

SEC. 7. *Cookery and Laundry Class-rooms.*—Cookery and Laundry class-rooms should have 30 sq. ft. of floor space for each scholar to be taught at any one time.

In cookery class-rooms, it is convenient to have two ranges, one open and the other closed, arranged on a slight cant across the angles at one end of the room with a dresser between them. Where gas is available, a gas stove provided with a flue to carry off fumes should be fixed in a convenient position against the side wall, if possible in a line with the table to be used for demonstration purposes. Provision for scullery work must be made, and the sink should be placed in full view of the teacher and scholars. If floor space permits, raised benches should be placed at the end of the room opposite the ranges and dresser. Kitchen tables should be provided, allowing 2 ft. 6 in. square for the use of each scholar in classes for practical work. Special arrangements should be made for ventilation, and the temperature should not be allowed to rise above 70°. A cookery room should be so placed that smells from cooking will not be liable to enter other parts of the school. There should be accommodation for at least 18 scholars.

In laundry rooms the tables should be large enough to allow at least 3 ft. of space for each girl when ironing. The ventilation of rooms for laundry work needs special arrangements for the removal of steam.

SEC. 8. *Workshops.*—In every school there should be, and in every Boarding School with more than 20 boarders there must be, a workshop or manual training room, well lighted and ventilated, which should provide for not less than 15 nor more than 20 scholars under instruction at one time. The latter number will require about 700 sq. ft. of floor area. For metal-working there should be not less than 4 ft. run of bench for every scholar. For wood-working, benches about 5 ft. long by 2 ft. 6 in. wide are recommended. There should be a space of at least 4 ft. in width between benches, and a clear space round every bench for wood-working. A rack for tools should be provided for every bench.

In plan, arrangement, lighting and ventilation the room should be modelled on a workshop rather than on a school. The construction may accordingly be simple. The roof may be of lean-to or other ordinary form. Its height at the windows in front of the benches need not be more than 10 ft. The light must be ample. A flat ceiling is not, as a rule, necessary, but ample provision must be made for the inlet of fresh air and extraction of foul air at the highest point.

Provision for blackboard teaching should be made.

SEC. 9. *Gymnasium.*—In every school it is desirable that there should be a gymnasium.

SEC. 10. *Music Rooms.*—In every school it is desirable to have a music class-room, and attached to it practice-rooms about 8 ft. by 6 ft. 6 in., divided by sound-proof partitions, and with sound-proof doors. Music and practice rooms if provided should be as much isolated as practicable.

SEC. 11. *Dining Halls.*—In every school there should be proper dining halls for day scholars as well as for boarders if any, and careful estimates should be made of the number of day scholars who may be expected to dine. Not less than 2 ft. should be allowed for every scholar at the table, and not less than 10 sq. ft. of floor area. The kitchen and necessary offices should be adjacent to the dining hall, with separate entrance, and so placed that smells from cooking will not be liable to enter the school.

SEC. 12. *Common-Rooms.*—In every school there must be a Headmaster's or Headmistress's room, and a common-room for other masters or mistresses.

In Pupil-Teacher Centres and other schools where scholars come from a distance, it is very advisable to provide common-rooms as well as dining-rooms for the scholars.

In every Boarding School there should be a common-room for the use of boarders out of school hours.

SEC. 13. *Library.*—In every school it is desirable that there should be, and in every Boarding School of more than 20 boarders there must be, a room furnished for use as a library.

SEC. 14. *Dormitories.*—If the scholars in a Boarding School sleep in dormitories there must be a space of not less than 3 ft. between beds. If the cubicle system is adopted, there must be a window to every cubicle. In sleeping rooms there should be floor space of 65 sq. ft., and cubic space of 800 cub. ft. for each scholar.

Masters' or Matrons' rooms should be placed so as to ensure some supervision over the dormitories. Lavatories should not be fitted in the dormitories.

SEC. 15. *Sick-rooms and Infirmaries.*—In every Boarding School there must be a sick-room, properly isolated, with separate lavatory and latrine. In a sick-room the beds must be free of the walls. There should be not less than 6 ft. space between beds, and, if possible, a window between every two beds, the windows being opposite each other. All internal angles of walls, floors and ceilings should be rounded.

There must be in a sick-room 1,000 cub. ft. for each bed.

Water-closets and bathroom, with hospital bath, should be provided, with aerial disconnection from the sick-room. In Boarding Schools of more than 50 boarders, provision for infectious cases should be made in a separate building as far from the main building as conveniently practicable.

SEC. 16. *Headmaster's House.*—The Headmaster's house, if any, should be planned as a gentleman's residence, with accommodation for a family, and, especially in the case of a Boarding School, for the entertainment of visitors. For the Headmistress in a Girls' School proper apartments with reception rooms should be provided.

SEC. 17. *Boarding Houses.*—In every school for more than 80 boarders there should be separate houses, with accommodation, unless under exceptional circumstances, for not more than 50 in each house, under the charge of a master.

PART II.

RULE I.

Sites, Playgrounds, or Playing Fields.—The site for a new school should be carefully selected with a view to its surroundings, in order to avoid noise and dust. The access to it should be convenient. In towns the building should be kept well back from the street unless the position is a quiet one. There should, if possible, be a building frontage suitable to the area of the site.

A site open to the sun is especially valuable for the scholars in its effect upon ventilation and health. With regard to aspect, the most suitable direction for the class-rooms to face is South-east, East, and South, the other quarters being as far as possible utilised for windows to corridor, staircases, cloak-rooms, assembly hall, &c.

The area of the site should be sufficient not only to provide adequate playground space, but also, if possible, room for cricket and football, or, in the case of girls' schools, hockey and lawn tennis. For this purpose it is desirable to secure from 3 to 4 acres for a small school, increasing with the size of the school and the extent to which such games are likely to be played.

In any case there must be an open, fairly square, properly levelled, drained, and enclosed playground suitable to the size of the school, providing a clear unbuilt-upon space of 50 sq. ft. per head, but in no case must the playground contain less than 750 sq. yds. Special consideration will be given to the case of schools in large towns.

A part or the whole of this should be covered with asphalt or other suitable paving, in order to provide a suitable place for drilling, &c.

The playground should be given a warm, sunny aspect. Buttresses, corners and recesses should be avoided.

There should be a covered shed for games on wet days. In dual or mixed schools the playground should be separate for the two sexes.

Where biology is taken as a school subject it is desirable that enough ground should be secured to provide facilities for outdoor biological teaching.

Bicycle sheds should be provided.

RULE 2.

Walls, Floors and Roofs.—(*a.*) The walls of every room used for teaching, if ceiled at the level of the wall-plate, must be at least 12 ft. high from the level of the floor to the ceiling.

(*b.*) The walls of every room used for teaching, if ceiled to the rafters and collar-beam, must be at least 11 ft. high from the floor to the wall-plate, and at least 14 ft. to the ceiling across the collar-beam.

(*c.*) Great care should be taken to render the roofs impervious to cold and heat.

(*d.*) Roofs open to the apex are very undesirable. They can be permitted only where the roofs are specially impervious to heat and cold, and where apex-ventilation is provided.

(*e.*) In the case of a school of more than one storey special care must be taken to render the floors as far as possible sound-proof. Solid floors should be used on the ground floor.

(*f.*) The whole of the external walls of the school and residence (if any) should be solid. If of brick the thickness must be at least one brick and a half; and, if of stone, at least

20 in. Where hollow walls are proposed, one wall must be 9 in. thick with a 2-in. cavity.

(*g.*) All walls, not excepting fence walls, should have a damp-proof course just above the ground line.

(*h.*) The vegetable soil within the area of the building should be removed, the whole space covered by a layer of concrete not less than 6 in. thick, and air bricks inserted in *opposite* walls to ensure a through current of air under floors for ventilation to joists.

(*i.*) Timber should be protected from the mortar and cement by asphalt or tar.

(*k.*) Except where hard rock, gravel or chalk bottom is found, concrete foundations must be provided under all new walls. They must be not less than a foot thick, nor project less than 6 in. beyond the lowest course of footings on either side.

RULE 3.

Entrances.—Entrances must not be direct into a Central Hall or other room, and must not be used as cloak-rooms. For external doors having outside steps there should be a landing between door and steps. External doors should open outwards.

In schools of more than 150 scholars there should be more than one exit.

In mixed and dual schools there must be separate entrances for boys and girls.

RULE 4.

Staircases.—Staircases must be not less than 4 ft. nor more than 6 ft. wide, and must not have more than fourteen steps to a flight. Where possible they should be constructed with solid walls on both sides of the flight, and every staircase must have at least one external wall. They must be of fire-resisting materials, and well lighted in every part. In schools of more than 150 scholars with upstair rooms there must be at least two staircases.

Treads must be from 11 in. to 13 in. wide, and risers not more than $5\frac{1}{2}$ in. to 6 in. high; winders must be avoided.

RULE 5.

Cloak-Rooms and Lavatories.—In every school there must be cloak-rooms, lavatories and changing-rooms. They must not be passages. They should be entered from properly lighted and ventilated lobbies and must not be entered from any room used for teaching. They must be heated and ventilated so as to dry wet things and prevent any smells or damp from entering the school. Lavatory fittings should not be placed in cloak-rooms.

In mixed or dual schools there must be separate cloak-rooms and lavatories for boys and girls.

Suitable and adequate lavatory accommodation must be provided for the staff in addition to and apart from that for the pupils.

> Cloak-rooms should be well lighted from the end. Gangways at least 4 ft. wide should be made between the hanging-rails and seats. Pegs for hats and cloaks should be numbered, placed not less than 12 in. apart, and not placed one above another. In lavatories slate troughs with loose, not fixed, basins are recommended. The number of lavatory basins in day schools should be one for every 10 scholars up to 100, and one for every 15 scholars above the first 100. The floors should be of asphalt or other impervious material, and the walls of glazed brick or tile, or with at least a dado 5 ft. high of such materials. Glazed partitions should be used as far as possible. Changing-rooms should be provided with fixed seats, pegs, lockers and boot-racks. In small day schools accommodation for changing may be provided in the cloak-room.
>
> A lock-up slop sink, water-tap and cupboard are desirable for the caretaker.

RULE 6.

Lighting.—The area of window-glass should approximate to one-fifth the area of the floor space in rooms used for teaching, and in other rooms to not less than one-eighth.

Every part and corner of a school should be well lighted. The light in class-rooms must be admitted from the left side of the scholars. (This rule will be found greatly to influence the planning.) All other windows in class-rooms should be regarded as supplementary or for ventilation. Where left light is impossible, right light is next best. Windows full in the eyes of scholars cannot be approved. Unless the tops of the windows be more than 12 ft. above the floor the plan should show no space more than 20 ft. from the window-wall in any room used for teaching.

(*a.*) Windows should never be provided for the sake merely of external effect. All kinds of glazing which diminish the light and are troublesome to keep clean and in repair must be avoided. A large portion of each window should be made to open for ventilation and for cleaning.

(*b.*) The sills of the main lighting windows should be placed not more than 4 ft. above the floor; the tops of the windows should, as a rule, reach nearly to the ceiling; the upper portion should be made to swing. The ordinary rules respecting hospitals should here be remembered. Large spaces between the window heads and ceiling are productive of foul rooms.

(*c.*) Skylights are objectionable. They cannot be approved in school-rooms or class-rooms. They will only be allowed in Central Halls having ridge or apex ventilation.

(*d.*) The colouring of the walls and ceilings and of all fittings in the rooms should be carefully considered as affecting the light. This point and the size and position of the windows are especially important in their bearing on the eyesight of the children.

(*e.*) The windows should be properly distributed over the walls of the class-rooms so that every desk shall be sufficiently lighted. The glass line of the window furthest from the teacher should be on a line with the back of the last row of desks.

RULE 7.

Ventilation.—In each room there must be, independently of doors and windows, inlets for fresh air and outlets for foul air, communicating with the outer air. A large proportion of the windows should be made to open.

Inlets should be placed as far as may be from doors and fireplaces. They must not consist of gratings in floors.

Outlets for the extraction of foul air should be placed in such positions as are required by the system adopted.

Special attention must be paid to ventilation in chemical laboratories and in cookery and laundry rooms.

RULE 8.

Warming.—Warming may be done either by open firegrates (if possible arranged to admit fresh warm air), by hot-water pipes (in which case the principle of direct radiation is recommended), or by hot air. An even temperature of from 54° to 60° should be maintained.

RULE 9.

Closets.—(*a.*) Suitable and adequate closet accommodation must be provided for the staff in addition to and apart from that of the pupils.

If possible, the girls' offices should be in the main building but suitably isolated; if this is not possible, they should be connected by a covered corridor. Privacy of access must always be secured.

The boys' offices should be completely disconnected from and at a short distance from the school.

In Mixed or Dual Schools the offices and approaches to them must be wholly separate for the two sexes.

The number of closets required in the case of Day Schools is 1 for every 15 girls for the first 100 and 1 for each succeeding 25; 1 for every 25 boys, and 1 urinal for every 15 boys.

(*b.*) In Boarding Schools there should be closets near the dormitories but separated from them in cross-ventilated lobbies.

The number of closets required in the case of Boarding Schools is 4 for every 30 boarders for day use, and 1 for every 20 boarders for night use.

(*c.*) Each closet must be not less in the clear than 2 ft. 3 in. wide nor more than 3 ft., fully lighted and cross-ventilated.

They are best divided by partitions carried up 6 ft. only. Doors, if any, should be separated from the threshold by at least 4 in., and from the head by at least 6 in.

Automatic flushing for closets is undesirable and each closet should be fitted with its own apparatus.

(*d.*) If a cesspool system is unavoidable, the cesspool must be as far as possible removed from the playground, be fenced in, properly ventilated, and water-tight.

RULE 10.

Drains.—The arrangement of drains should be in accordance with the best approved modern practice, subject to the regulations of the Local Sanitary Authority, or, if none, subject to those of the nearest Urban Sanitary District Authority.

RULE 11.

Bathrooms.—In Boarding Schools two baths are required for every 25 boarders.

A good plan for baths is a room with a floor of asphalt, lead, or other impervious material, with taps and moveable baths, or shower baths.

RULE 12.

Water Supply.—All schools should be provided with an adequate supply of wholesome drinking water.

In cases where such supply cannot be obtained from the mains of an Authority or Company authorised to supply water, care must be taken to ascertain that the supply proposed to be adopted is adequate in quantity, is of suitable character and is not liable to pollution in any way, as, *e.g.*, by surface drainage, or by leakage from sewers, drains, cesspools, or other receptacles.

All water pipes should be so laid or fixed as to be properly protected from frost, and so that in the event of their becoming unsound the water conveyed in such pipes will not be liable to become fouled, or to escape without observation.

There should be no direct communication between any pipe or cistern from which water is drawn for domestic purposes, and any water closet or urinal.

All water closets and urinals should be provided with proper service cisterns, which together with the outlet therefrom should be capable of providing a sufficient flush.

Any cistern to be used for the storage of water should be water-tight and be properly covered and ventilated, and should be placed in such a position that the interior thereof may be readily inspected and cleansed.

PART III.

SUBMISSION OF PLANS.

Before recognising newly erected premises as suitable for a Secondary School the Board must be satisfied by the submission of plans (drawn in accordance with the prescribed requirements) that the Building Regulations are complied with.

N.B.—The promoters of schools must take their own measures to secure that their plans are in order under any Bye-laws which may be in force in the district in which the school is situated.

Plans relating to Secondary Schools, and correspondence on such plans, should invariably be addressed to the Secretary, Board of Education, Whitehall, London, S.W., and not to any officer of the Board by name.

Plans must, except in special circumstances, be submitted to the Board through the Governing Body by their recognised correspondent, unless that body has approved the direct submission of plans to the Board by an Architect or by a Committee. In such cases the covering letter should refer to the direction or approval of the Governing Body, and failing this the Board may decline to consider the plans; in any case much delay and confusion are caused.

In cases where sufficient funds are not available for the immediate erection of the whole building, those portions not proposed to be carried out at once should be clearly indicated.

Duplicate copies of the block plan and of the plan of each floor must be sent for retention by the Board.

REQUIREMENTS.

(*All plans whether for new buildings or for improvements in existing buildings, must be submitted in accordance with the requirements which follow; plans which do not fully comply with these requirements cannot be considered.*)

I. A block plan of the site, drawn in ink to a scale of 20 ft. to an inch. This plan must indicate:—

(*a.*) The position of the school buildings.
(*b.*) Outbuildings.
(*c.*) Playground.
(*d.*) Drains (collateral and main), with their fall and depth below ground.
(*e.*) Entrances.
(*f.*) Boundary walls, or fences, and their nature.
(*g.*) Roads.
(*h.*) The points of the compass.
(*i.*) The levels of the ground at the principal points.

N.B.—For approval of the site alone, the plan should show (*g.*) (*h.*) and (*i.*).

II. A plan of each floor of all the buildings drawn in ink to a scale of 8 ft. to an inch. The internal fittings of the rooms (*fireplaces, groups of desks, &c.*) must be accurately shown. The plan should also state whether the rooms are intended for boys or girls.

In cases of enlargements, a plan, showing the buildings as they exist, is needed.

III. Sections and at least four elevations, also drawn in ink to a scale of 8 ft. to an inch. The ceiling, the positions of window-heads in relation thereto, and the mode of ventilation must be shown.

N.B.—(*a.*) Pencil drawings cannot be received, but sketch plans or coloured tracings in ink on tracing cloth may be submitted while plans are in the preliminary stage of pencil, so that suggested alterations can be adopted without difficulty or expense. Such plans may be drawn to a scale of 16 ft. to one inch. The Board's final approval will not in any case be given to preliminary plans, and the full plans described above will always be required.

(*b.*) Diagrams are of no value and cannot be accepted.

(*c.*) In the case of enlargements or alterations the whole site and the existing building should be as accurately shown in every respect as the proposed changes, and in such a manner that any change of numbers can be ascertained.

(*d.*) All plans should be dated, the scales drawn on, and dimensions figured.

(*e.*) It is preferable that all plans should be submitted on linen tracing paper or other material which can be folded.

IV. A concise description of the buildings and of the various rooms, with their dimensions and uses. The total number of scholars of each sex for whom accommodation is proposed to be provided must be stated.

V. In the case of alterations, adaptations, or additions the proposed accommodation must be clearly shown.

VI. A draft specification.

VII. An estimate of the total expenditure proposed.

PART IV.

CONDITIONS OF RECOGNITION OF NEW BUILDINGS.

A newly erected building for which plans have not been approved or conditionally approved by the Board of Education before 1st January 1908 will not be recognised for use as a Secondary School, unless it is shown, by plans submitted in accordance with the requirements of Part III. of these Regulations, that the Rules of Part II. will be observed. In exceptional cases, where special circumstances exist, the Rules of Part II. may be waived by the Board in some particulars. On any question arising under these Regulations the decision of the Board is final.

Newly erected buildings, unless for good reason, should be planned in accordance with the principles set out in the several sections of Part I., and the Board may refuse to recognise a school, if, in their opinion, these principles have been unnecessarily departed from.

APPENDIX E.

EXTRACTS FROM THE BYE-LAWS MADE BY THE LONDON COUNTY COUNCIL UNDER SECTION 39 (1) OF THE PUBLIC HEALTH (LONDON) ACT, 1891, AND CONFIRMED BY THE LOCAL GOVERNMENT BOARD, 28TH JUNE 1893.

Water and earth closets.

1. Every person who shall hereafter construct a water-closet or earth-closet in connection with a building shall construct such water-closet or earth-closet in such a position that, in the case of a water-closet, one of its sides at the least shall be an external wall, and in the case of an earth-closet two of its sides at the least shall be external walls, which external wall or walls shall abut immediately upon the street, or upon a yard or garden or open space of not less than 100 sq. ft. of superficial area, measured horizontally at a point below the level of the floor of such closet. He shall not construct any such water-closet so that it is approached directly from any room used for the purpose of human habitation, or used for the manufacture, preparation, or storage of food for man, or used as a factory, workshop, or workplace, nor shall he construct any earth-closet so that it can be entered otherwise than from the external air.

Water-closets.

He shall construct such water-closet so that on any side on which it would abut on a room intended for human habitation, or used for the manufacture, preparation, or storage of food for man, or used as a factory, workshop, or workplace, it shall be enclosed by a solid wall or partition of brick or other materials, extending the entire height from the floor to the ceiling.

He shall provide any such water-closet that is approached from the external air with a floor of hard smooth impervious material, having a fall to the door of such water-closet of ½ in. to the foot.

He shall provide such water-closet with proper doors and fastenings.

Provided always that this Bye-law shall not apply to any water-closet constructed below the surface of the ground, and approached directly from an area or other open space available for purposes of ventilation, measuring at least 40 super. ft. in extent, and having a distance across of not less than 5 ft., and not covered in otherwise than by a grating or railing.

2. Every person who shall construct a water-closet in connection with a building, whether the situation of such water-closet be or be not within or partly within such building, and every person who shall construct an earth-closet in connection with a building, shall construct in one of the walls of such water-closet or earth-closet which shall abut upon the public way, yard, garden, or open space, as provided by the preceding Bye-law, a window of such dimensions that an area of not less than 2 sq. ft., which may be the whole or part of such window, shall open directly into the external air.

He shall, in addition to such window, cause such water-closet or earth-closet to be provided with adequate means of constant ventilation by at least one air-brick built in an external wall of such water-closet or earth-closet, or by an air-shaft, or by some other effectual method or appliance.

3. Every person who shall construct a water-closet in connection with a building, shall furnish such water-closet with a cistern of adequate capacity for the purpose of flushing, which shall be separate and distinct from any cistern used for drinking purposes, and shall be so constructed, fitted, and placed as to admit of the supply of water for use in such water-closet, so that there shall not be any direct connection between any service pipe upon the premises and any part of the apparatus of such water-closet other than such flushing cistern.

Provided always that the foregoing requirement shall be deemed to be complied with in any case where the apparatus of a water-closet is connected for the purpose of flushing with a cistern of adequate capacity, which is used solely for flushing water-closets or urinals.

He shall construct or fix the pipe and union connecting such flushing cistern with the pan, basin, or other receptacle with which such water-closet may be provided, so that such pipe and union shall not in any part have an internal diameter of less than 1¼ in.

He shall furnish such water-closet with a suitable apparatus for the effectual application of water to any pan, basin, or other receptacle with which such apparatus may be connected and used, and for the effectual flushing and cleansing of such pan, basin, or other receptacle, and for the prompt and effectual removal therefrom and from the trap connected therewith of any solid or liquid filth which may from time to time be deposited therein.

He shall furnish such water-closet with a pan, basin, or other suitable receptacle of non-absorbent material, and of such shape, of such capacity, and of such mode of construction as to receive and contain a sufficient quantity of water, and to allow all filth which may from time to time be deposited in such pan, basin, or receptacle, to fall free of the sides thereof and directly into the water received and contained in such pan, basin, or receptacle.

He shall not construct or fix under such pan, basin, or receptacle, any "container" or other similar fitting.

He shall construct or fix immediately beneath or in connection with such pan, basin, or other suitable receptacle, an efficient siphon trap, so constructed that it shall at all times maintain a sufficient water seal between such pan, basin, or other suitable receptacle and any drain or soil pipe in connection therewith. He shall not construct or fix in or in connection with the water-closet apparatus any D trap or other similar trap.

Note.—The last paragraph of Bye-law 3, omitted here, and the whole of Bye-law 4, have been repealed by a Bye-law allowed by the Local Government Board on 14th June 1901, and which it is unnecessary to give in this place. The subject matter is respecting soil and anti-siphonage pipes.

5. A person who shall newly fit or fix any apparatus in connection with any existing water-closet, shall as regards such apparatus and its connection with any soil-pipe or drain, comply with such of the requirements of the foregoing Bye-laws as would be applicable to the apparatus so fitted or fixed if the water-closet were being newly constructed.

Earth-closets

6. Every person who shall construct an earth-closet in connection with a building shall furnish such earth-closet with a reservoir or receptacle, of suitable construction and of adequate capacity, for dry earth, and he shall construct and fix such reservoir or receptacle in such a manner and in such a position as to admit of ready access to such reservoir or receptacle for the purpose of depositing therein the necessary supply of dry earth.

He shall construct or fix in connection with such reservoir or receptacle suitable means or apparatus for the frequent and effectual application of a sufficient quantity of dry earth to any filth which may from time to time be deposited in any receptacle for filth constructed, fitted, or used in, or in connection with, such earth-closet.

He shall construct such earth-closet so that the contents of such reservoir or receptacle may not at any time be exposed to any rainfall or to the drainage of any waste water or liquid refuse from any premises.

7. Every person who shall construct an earth-closet in connection with a building shall construct such earth-closet for use in combination with a moveable receptacle for filth.

He shall construct such earth-closet so as to admit of a moveable receptacle for filth, of a capacity not exceeding 2 cub. ft., being placed and fitted beneath the seat in such a manner and in such a position as may effectually prevent the deposit upon the floor or sides of the space beneath such seat, or elsewhere than in such receptacle, of any filth which may from time to time fall or be cast through the aperture in such seat.

He shall construct such receptacle for filth in such a manner and in such a position as to admit of the frequent and effectual application of a sufficient quantity of dry earth to any filth which may be from time to time deposited in such receptacle for filth, and in such a manner and in such a position as to admit of ready access for the purpose of removing the contents thereof.

He shall also construct such earth-closet so that the contents of such receptacle for filth may not at any time be exposed to any rainfall or to the drainage of any waste water or liquid refuse from any premises.

Privies.

8. Every person who shall construct a privy in connection with a building shall construct such privy at a distance of 20 ft. at the least from a dwelling-house, or public building, or any building in which any person may be or may be intended to be employed in any manufacture, trade, or business.

9. A person who shall construct a privy in connection with a building shall not construct such privy within the distance of 100 ft. from any well, spring, or stream of water used, or likely to be used, by man for drinking or domestic purposes, or for manufacturing drinks for the use of man, or otherwise in such a position as to render any such water liable to pollution.

10. Every person who shall construct a privy in connection with a building shall construct such privy in such a manner and in such a position as to afford ready means of access to such privy, for the purpose of cleansing such privy and of removing filth therefrom, and in such a manner and in such a position as to admit of all filth being removed from such privy, and from the premises to which such privy may belong, without being carried through any dwelling-house, or public building, or any building in which any person may be or may be intended to be employed in any manufacture, trade, or business.

11. Every person who shall construct a privy in connection with a building, shall provide such privy with a sufficient opening for ventilation as near to the top as practicable and communicating directly with the external air.

He shall cause the floor of such privy to be flagged or paved with hard tiles or other non-absorbent material, and he shall construct such floor so that it shall be in every part thereof at a height of not less than 6 in. above the level of the surface of the ground adjoining such privy, and so that such floor shall have a fall or inclination towards the door of such privy of ½ in. to the foot.

12. Every person who shall construct a privy in connection with a building shall construct such privy for use in combination with a moveable receptacle for filth, and shall construct over the whole area of the space immediately beneath the seat of such privy a floor of flagging or asphalte or some suitable composite material, at a height of not less than 3 in. above the level of the surface of the ground adjoining such privy; and he shall cause the whole extent of each side of such space between the floor and the seat, other than any part that may be occupied by any door or other opening therein, to be constructed of flagging, slate, or good brickwork, at least 9 in. thick, and rendered in good cement or asphalted.

He shall construct the seat of such privy, the aperture in such seat, and the space beneath such seat, of such dimensions as to admit of a moveable receptacle for filth (of a capacity not exceeding 2 cub. ft.) being placed and fitted beneath such seat in such a manner and in such a position as may effectually prevent the deposit upon the floor or sides of the space beneath such seat, or elsewhere than in such receptacle, of any filth which may from time to time fall or be cast through the aperture in such seat.

He shall construct such privy so that for the purpose of cleansing the space beneath the seat, or of removing therefrom or placing or fitting therein an appropriate receptacle for filth, there shall be a door or other opening in the back or one of the sides thereof capable of being opened from the outside of the privy, or in any case where such a mode of construction may be impracticable, so that for the purposes aforesaid the whole of the seat of the privy or a sufficient part thereof may be readily moved or adjusted.

13. A person who shall construct a privy in connection with

a building shall not cause or suffer any part of the space under the seat of such privy, or any part of any receptacle for filth in or in connection with such privy, to communicate with any drain.

Water-closets, earth-closets, and privies.

14. Every person who shall intend to construct any water-closet, earth-closet, or privy, or to fit or fix in or in connection with any water-closet, earth-closet, or privy, any apparatus or any trap or soil-pipe, shall, before executing any such works, give notice in writing to the clerk of the Sanitary Authority.

Earth-closets and privies.

15. Every owner of an earth-closet or privy existing at the date of the confirmation of these Bye-laws shall, before the expiration of six months from and after such date of confirmation, cause the same to be reconstructed in such a manner that its position, structure and apparatus shall comply with such of the requirements of the foregoing Bye-laws as are applicable to earth-closets or privies newly constructed.

Ashpits.

16. When any person shall provide an ashpit in connection with a building, he shall cause the same to consist of one or more moveable receptacles sufficient to contain the house refuse which may accumulate during any period not exceeding one week. Each of such receptacles shall be constructed of metal and shall be provided with one or more suitable handles and cover. The capacity of each of such receptacles shall not exceed 2 cub. ft.

Provided that the requirement as to the size of each of such receptacles shall not apply to any person who shall construct such receptacle or receptacles in connection with any premises to which there is attached (as part of the conditions of tenancy) the right to dispose of house refuse in an ashpit used in common by the occupiers of several tenancies; but in no case shall such ashpit be of greater capacity than is required to enable it to contain the refuse which may accumulate during any period not exceeding one week.

17. The occupier of any premises who shall use any ashpit shall, if such ashpit consist of a moveable receptacle, cause such receptacle to be kept in a covered place, or to be properly covered, so that it shall not be exposed to rainfall, and if such

ashpit consist of a fixed receptacle, he shall cause the same to be kept properly covered.

18. Where the Sanitary Authority have arranged for the daily removal of house refuse in their district, or in any part thereof, the owner of any premises in such district or part thereof shall provide an ashpit which shall consist of one or more moveable receptacles, sufficient to contain the house refuse which may accumulate during any period not exceeding three days, which the Sanitary Authority may determine, and of which the Sanitary Authority shall give notice by public announcement in their district. Each of such receptacles shall be constructed of metal, and provided with one or more suitable handles and cover. The capacity of each of such receptacles shall not exceed 2 cub. ft.

Provided always that this Bye-law shall not apply to the owner of any premises until the expiration of three months after the Sanitary Authority have publicly notified their intention to adopt a system of daily collection of house refuse in that part of their district which comprises such premises.

19. Where any receptacle shall have been provided as an ashpit for any premises in pursuance of any Bye-Law in that behalf, no person shall deposit the house refuse which may accumulate on such premises in any ashpit that does not comply with the requirements of these Bye-laws.

Cesspools.

20. Every person who shall construct a cesspool in connection with a building shall construct such cesspool at a distance of 100 ft. at the least from a dwelling-house, or public building, or any building in which any person may be, or may be intended to be, employed in any manufacture, trade, or business.

21. A person who shall construct a cesspool in connection with a building shall not construct such cesspool within the distance of 100 ft. from any well, spring, or stream of water.

22. Every person who shall construct a cesspool in connection with a building shall construct such cesspool in such a manner and in such a position as to afford ready means of access to such cesspool, for the purpose of cleansing such cesspool, and

of removing the contents thereof, and in such a manner and in such a position as to admit of the contents of such cesspool being removed therefrom and from the premises to which such cesspool may belong, without being carried through any dwelling-house, or public building, or any building in which any person may be, or may be intended to be, employed in any manufacture, trade, or business.

He shall not in any case construct such cesspool so that it shall have, by drain or otherwise, any means of communication with any sewer or any overflow outlet.

23. Every person who shall construct a cesspool in connection with a building shall construct such cesspool of good brickwork bedded and grouted in cement, properly rendered inside with cement, and with a backing of at least 9 in. of well-puddled clay around and beneath such brickwork, and so that such cesspool shall be perfectly watertight.

He shall also cause such cesspool to be arched or otherwise properly covered over, and to be provided with adequate means of ventilation.

Dung pits.

24. A person shall not use as a receptacle for dung any receptacle so constructed or placed that one of its sides shall be formed by the wall of any room used for human habitation, or under a dwelling-house, factory, workshop, or workplace, and he shall not use any receptacle in such a situation that it would be likely to cause a nuisance or become injurious or dangerous to health.

25. Every owner of any existing receptacle for dung shall, before the expiration of six months from the date of the confirmation of these Bye-laws, and every person who shall construct a receptacle for dung shall cause such receptacle to be so constructed that its capacity shall not be greater than 2 cub. yds., and so that the bottom or floor thereof shall not, in any case, be lower than the surface of the ground adjoining such receptacle.

He shall so construct such receptacle that a sufficient part of one of its sides shall be readily removeable for the purpose of facilitating cleansing.

He shall also cause such receptacle to be constructed in such a manner and of such materials, and to be maintained at all times in such a condition as to prevent any escape of the contents thereof, or any soakage therefrom, into the ground or into the wall of any building.

He shall cause such receptacle to be so constructed that no rain or water can enter therein, and so that it shall be freely ventilated into the external air.

Provided that a person who shall construct a receptacle for dung, the whole of the contents of which are removed not less frequently than every forty-eight hours, shall not be required to construct such receptacle so that its capacity shall not be greater than 2 cub. yds.

And provided that a person who shall construct a receptacle for dung, which shall contain only dung of horses, asses, or mules with stable litter, and the whole of the contents of which are removed not less frequently than every forty-eight hours, may, instead of all other requirements of this Bye-law, construct a metal cage, and shall beneath such metal cage adequately pave the ground at a level not lower than the surrounding ground, and in such a manner and to such an extent as will prevent any soakage into the ground; and if such cage be placed near to or against any building, he shall adequately cement the wall of such building in such a manner and to such an extent as will prevent any soakage from the dung within or upon such receptacle into the wall of such building.

Water-closet, earth-closet, and privy accommodation.

The landlord or owner of any lodging-house shall provide and maintain in connection with such house, water-closet, earth-closet, or privy, accommodation in the proportion of not less than one water-closet, earth-closet, or privy for every twelve persons.

For the purposes of this Bye-law "a lodging-house" means a house or part of a house which is let in lodgings or occupied by members of more than one family. "Landlord" in relation to a house or part of a house which is let in lodgings, or occupied by members of more than one family, means the person (whatever may be the nature or extent of his interest) by whom or on whose behalf such house or part of a house is let in lodgings or for occupation by members of more than one family, or who for the time being receives or is entitled to receive the profits arising from such letting. "Lodger" in relation to a house or part of a house which is let in lodgings or occupied by members of more than one family, means a person to whom any room or rooms in such house or part of a house may have been let as a lodging or for his use or occupation.

Nothing in this Bye-law shall extend to any common lodging-house.

APPENDIX F.

EXTRACTS FROM THE FACTORY AND WORKSHOP ACT, 1901 (1 ED. VII., CAP. 22).

SEC. 3.—(1.) A factory shall (for the purposes of this Act) and a workshop shall (for the purposes of the law relating to public health) be deemed to be so overcrowded as to be dangerous or injurious to the health of the persons employed therein, if the number of cubic feet of space in any room therein bears to the number of persons employed at one time in the room a proportion less than 250 (or during any period of overtime, 400) cub. ft. of space to every person.

(2.) Provided that the Secretary of State may, by special Order, modify this proportion for any period during which artificial light other than electric light is employed for illuminating purposes, and may, by like Order, as regards any particular manufacturing process or handicraft, substitute for the said figures of 250 and 400 respectively any higher figures, and thereupon this section shall have effect as modified by the Order.

(3.) Where a workshop or workplace, not being a *domestic** workshop, is occupied by day as a workshop and by night as a sleeping apartment, the Secretary of State may by special Order modify the proportion of cubic feet of space prescribed by this section, and substitute therefor any higher figures, and thereupon this section shall have effect as modified by the Order.

. . . .

SEC. 8.—(1.) In every factory or workshop or part thereof in which any process is carried on which renders the floor liable to be wet to such an extent that the wet is capable of being removed by drainage, adequate means shall be provided for draining off the wet.

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* For definition of "Domestic Workshop" see Sec. 115, page 258.

(*N.B.*—This does not apply to men's workshops, that is to say, workshops conducted on the system of not employing any woman, young person, or child.)

. . . .

SEC. 9.—(1.) Every factory and workshop must be provided with sufficient and suitable accommodation in the way of sanitary conveniences, regard being had to the number of persons employed in or in attendance at the factory or workshop, and also where persons of both sexes are or are intended to be employed or in attendance, with proper separate accommodation for persons of each sex.

(2.) The Secretary of State shall, by special Order, determine what is sufficient and suitable accommodation within the meaning of this section.

(3.) A factory or workshop in which there is a contravention of this section shall be deemed not to be kept in conformity with this Act.

(4.) This section does not apply to the administrative county of London, or to any place where section 22 of the Public Health Acts Amendment Act, 1890, is in force.

SEC. 15. Every District Council shall, in addition to any powers which they possess with reference to the prevention of fire, have power to make Bye-laws providing for means of escape from fire in the case of any factory or workshop, and sections 182 to 186 of Public Health Act (1875) shall apply to any bye-laws so made.

SEC. 16. . . . .

(2.) In every factory or workshop the construction of which was not commenced before the first day of January 1896, the doors of each room in which more persons than ten are employed, shall, except in the case of sliding doors, be constructed so as to open outwards.

. . . .

* SEC. 74. If in a factory or workshop where grinding, glazing, or polishing on a wheel, or any process is carried on, by which dust or any gas, vapour, or other impurity is generated and inhaled by the workers to an injurious extent, it appears to an inspector that such inhalation could be to a great extent prevented by the use of a fan or other mechanical means, the inspector may direct that a fan or other mechanical means of a proper construction for preventing such inhalation be provided within a reasonable time, and if the same is not provided, maintained and used, the factory or workshop shall be deemed not to be kept in conformity with this Act.

* SEC. 75.—(1.) In every factory or workshop where lead, arsenic, or any other poisonous substance is used, suitable washing conveniences must be provided for the use of the persons employed in any department where such substances are used.

(2.) In every factory or workshop where lead, arsenic, or any other poisonous substance is so used as to give rise to dust or fumes, a person shall not be allowed to take a meal, or to remain during the times allowed to him for meals, in any room in which any such substance is used, and suitable provision shall be made for enabling the persons employed in such rooms to take their meals elsewhere in the factory or workshop.

. . . .

SEC. 78.—(1.) A woman, young person, or child † must not be allowed to take a meal or to remain during the times allowed for meals in the following factories or workshops, or parts of factories or workshops; that is to say—

(*a.*) In the case of glass-works, in any part in which the materials are mixed; and

(*b.*) In the case of glass-works where flint glass is made, in any part in which the work of grinding, cutting, or polishing is carried on; and

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* Sections 74 and 75 do not apply to men's workshops, that is to say, workshops conducted on the system of not employing any woman, young person, or child.

† For definition of these terms see Sect. 156, page 262.

(*c.*) In the case of lucifer-match works, in any part in which any manufacturing process or handicraft (except that of cutting the wood) is usually carried on; and

(*d.*) In the case of earthenware works, in any part known or used as dipper's house, dipper's drying-room, or china scouring-room.

. . . .

(4.) Where it appears to the Secretary of State that by reason of the nature of the process in any class of factories or workshops, or parts thereof not named in this section, the taking of meals therein is specially injurious to health, he may, if he thinks fit, by special Order, extend the prohibition in this section to the class of factories or workshops or parts thereof.

. . . .

SEC. 94.—(5.) In every cotton cloth factory erected after the second day of February 1898, a sufficient and suitable cloak-room (or cloak-rooms) shall be provided for the use of all the persons employed therein, and shall be ventilated and kept at a suitable temperature.

. . . .

SEC. 97.—(1.) It shall not be lawful to let or suffer to be occupied or to occupy any room or place as a bakehouse, unless the following regulations are complied with:—

(*a.*) A water-closet, earth-closet, privy, or ashpit must not be within, or communicate directly with the bakehouse;

(*b.*) Every cistern for supplying water to the bakehouse must be separate and distinct from any cistern for supplying water to a water-closet;

(*c.*) A drain or pipe for carrying off fæcal or sewage matter must not have an opening within the bakehouse.

. . . .

SEC. 100.—(1.) A place on the same level with a bakehouse, and forming part of the same building, may not be used as a sleeping place, unless it is constructed as follows; that is to say—

(*a.*) Is effectually separated from the bakehouse by a partition extending from the floor to the ceiling; and

(*b.*) Has an external glazed window of at least 9 super. ft. in area, of which at the least 4½ super. ft. are made to open for ventilation.

. . . .

SEC. 101.—(1.) An underground bakehouse shall not be used as a bakehouse unless it was so used at the passing of this Act.

(2.) Subject to the foregoing provision, after the first day of January 1904 an underground bakehouse shall not be used unless certified by the District Council to be suitable for that purpose.

(3.) For the purpose of this section an underground bakehouse shall mean a bakehouse, any baking-room of which is so situate that the surface of the floor is more than 3 ft. below the surface of the footway of the adjoining street, or of the ground adjoining or nearest to the room. The expression "baking-room" means any room used for baking, or for any process incidental thereto.

(4.) An underground bakehouse shall not be certified as suitable unless the District Council is satisfied that it is suitable as regards construction, light, ventilation, and in all other respects.

(5.) This section shall have effect as if it were included among the provisions relating to bakehouses which are referred to in section 26 of the Public Health (London) Act, 1891.

. . . .

SEC. 103.—(3.) In the case of every laundry worked by steam, water, or other mechanical power:—

(*a.*) A fan or other means of a proper construction must be provided, maintained and used for regulating the temperature in every ironing-room, and for carrying away the steam in every washhouse in the laundry; and

(*b.*) All stoves for heating irons must be sufficiently separated from any ironing-room, and gas irons emitting any noxious fumes must not be used; and (*c.*) The floors must be kept in good condition and drained in such manner as will allow the water to flow off freely.

A laundry in which these provisions are contravened shall be deemed to be a factory not kept in conformity with this Act.

(4.) Nothing in this section shall apply to any laundry in which the only persons employed are :—

(*a.*) Inmates of any prison, reformatory, or industrial school, or other institution for the time being subject to inspection under any Act other than this Act; or

(*b.*) Inmates of an institution conducted in good faith for religious or charitable purposes; or

(*c.*) Members of the same family dwelling there, or in which not more than two persons dwelling elsewhere, are employed.

SEC. 114.—(1.) The exercise in a private house or private room by the family dwelling therein, or by any of them, of manual labour by way of trade or for purposes of gain in or incidental to any of the following handicrafts, namely :—

(i.) Straw plaiting, or (ii.) pillow-lace making, or (iii.) glove making, shall not of itself constitute the house or room a workshop within the meaning of this Act.

. . . .

SEC. 115. The expressions "domestic factory" and "domestic workshop" mean a private house, room, or place which, though used as a dwelling, is, by reason of the work carried on there, a factory or a workshop, as the case may be, within the meaning of this Act, and in which neither steam, water, nor other mechanical power is used in aid of the manufacturing process carried on there, and in which the only persons employed are members of the same family dwelling there.

SEC. 149.—(1.) Subject to the provisions of this section, the following expressions have in this Act the meanings hereby assigned to them; that is to say—

The expression "textile factory" means any premises wherein or within the close or curtilage of which, steam, water, or other mechanical power is used to move or work any machinery employed in preparing, manufacturing, or finishing, or in any process incident to the manufacture of cotton, wool, hair, silk, flax, hemp, jute, tow, china-grass, cocoanut fibre, or other like material, either separately or mixed together, or mixed with any other material or any fabric made thereof:

Provided that print works, bleaching and dyeing works, lace warehouses, paper mills, flax scutch mills, rope works, and hat works shall not be deemed to be textile factories.

The expression "non-textile factory" means—

(*a*.) Any works, warehouses, furnaces, mills, foundries, or places named in Part One of Schedule VI. to this Act; and

(*b*.) Any premises or places named in Part Two of the said Schedule wherein or within the close or curtilage or precincts of which, steam, water, or other mechanical power is used in aid of the manufacturing process carried on there; and

(*c*.) Any premises wherein or within the close or curtilage or precincts of which any manual labour is exercised by way of trade or for purposes of gain in or incidental to any of the following purposes, namely—

(i.) The making of any article or of part of any article; or
(ii.) The altering, repairing, ornamenting, or finishing of any article; or
(iii.) The adapting for sale of any article,

and wherein or within the close or curtilage or precincts of which, steam, water, or other mechanical power is used in aid of the manufacturing process carried on there.

The expression "factory" means textile factory and non-textile factory, or either of those descriptions of factories.

The expression "tenement factory" means a factory where mechanical power is supplied to different parts of the same building occupied by different persons for the purpose of any manufacturing process or handicraft, in such manner that those parts constitute in law separate factories, and for the purpose of the provisions of this Act with respect to tenement factories all buildings situate within the same close or curtilage shall be treated as one building.

The expression "workshop" means—

(*a.*) Any premises or places named in Part Two of Schedule VI. to this Act, which are not a factory; and

(*b.*) Any premises, room, or place, not being a factory, in which premises, room, or place, or within the close or curtilage or precincts of which premises any manual labour is exercised by way of trade or for purposes of gain in or incidental to any of the following purposes, namely—

(i.) The making of any article or of part of any article; or

(ii.) The altering, repairing, ornamenting, or finishing of any article; or

(iii.) The adapting for sale of any article,

and to or over which premises, room, or place the employer of the persons working therein has the right of access or control.

The expression "workshop" includes a tenement workshop.

The expression "tenement workshop" means any workplace in which, with the permission of or under agreement with the owner or occupier, two or more persons carry on any work which would constitute the workplace a workshop if the persons working therein were in the employment of the owner or occupier.

(2.) A part of a factory or workshop may, with the approval in writing of the chief inspector, be taken for the purposes of this Act to be a separate factory or workshop.

(3.) A room solely used for the purpose of sleeping therein shall not be deemed to form part of the factory or workshop for the purposes of this Act.

(4.) Where a place situate within the close, curtilage, or precincts forming a factory or workshop is solely used for some purpose other than the manufacturing process or handicraft carried on in the factory or workshop, that place shall not be deemed to form part of the factory or workshop for the purposes of this Act, but shall, if otherwise it would be a factory or workshop, be deemed to be a separate factory or workshop, and be regulated accordingly.

(5.) A place or premises shall not be excluded from the definition of a factory or workshop by reason only that the place or premises is or are in the open air.

(6.) The exercise by any young person or child in any recognised efficient school, during a portion of the school hours, of any manual labour for the purpose of instructing the young person or child in any art or handicraft, shall not be deemed to be an exercise of manual labour for the purpose of gain within the meaning of this Act.

SEC. 153.—(1.) In the application to the administrative county of London of the section of this Act relating to the means of escape from fire, the London County Council shall take the place of the District Council, and their expenses in the execution of that section shall be defrayed as part of their expenses in the management of the London Building Act, 1894.

(2.) In the application to the administrative county of London of the section of this Act giving power to make Bye-laws providing for means of escape from fire, the reference to a District Council shall be construed as a reference to the London County Council.

(3.) The power of the London County Council under section 164 of the London Building Act, 1894, to make Bye-laws with respect to the means of escape from fire in buildings exceeding 60 ft. in height, shall extend to all factories and workshops whether exceeding 60 ft. in height or not.

(4.) Subject as aforesaid, references in this Act to a District Council and the district thereof shall, as regards the city of London, be construed as references to the Court of Common Council and the City, and as regards any other part of the administrative county of London, as references to the Council of a metropolitan borough and the metropolitan borough.

SEC. 154.—References in this Act to a District Council and the district thereof shall be construed as including references to the Council of a County borough and the County borough.

SEC. 155.—The powers conferred by this act on District Councils shall be in addition to, and not in substitution for any other powers which they may possess.

SEC. 156.—(1.) In this Act, unless the context otherwise requires—

. . . .

The expression "child" means a person who is under the age of fourteen years, and who has not, being of the age of thirteen years, obtained the certificate of proficiency or attendance at school mentioned in Part III. of this Act.

. . . .

The expression "owner" has the meaning given to it by section 4 of the Public Health Act, 1875.

. . . .

The expression "process" includes the use of any locomotive.

. . . .

The expression "woman" means a woman of the age of eighteen years and upwards.

The expression "young person" means a person who has ceased to be a child and is under the age of eighteen years.

. . . .

SEC. 158.—Nothing in this Act shall extend to any young person, being a mechanic, artisan, or labourer, working only in repairing either the machinery in or any part of a factory or workshop.

Third Schedule.

Regulations as to grinding in tenement factory—

(1.) Boards to fence the shafting and pulleys, locally known as drum boards, must be provided and kept in proper repair.

(2.) Handrails must be fixed over the drums and kept in proper repair.

(3.) Belt guards, locally known as scotchmen, must be provided and kept in proper repair.

(4.) Every floor constructed on or after the first day of January 1896 must be so constructed and maintained as to facilitate the removal of slush, and all necessary shoots, pits, and other conveniences must be provided for facilitating such removal.

(5.) Every grinding room or hull established on or after the first day of January 1896 must be so constructed that for the purpose of light grinding there shall be a clear space of 3 ft. at least between each pair of troughs, and for the purpose of heavy grinding there shall be a clear space of 4 ft. at least between each pair of troughs, and 6 ft. at least in front of each trough.

(6.) The sides of all drums in every grinding room or hull must be closely fenced.

(7.) Except in pursuance of a special exemption granted by the Secretary of State, a grindstone must not be run before any fireplace or in front of another grindstone.

(8.) A grindstone erected on or after the first day of January 1896 must not be run before any door or other entrance.

Sixth Schedule.

Note by the Author.—This Schedule to the Factory and Workshop (1901) Act gives lists of factories and workshops with extended definitions; the lists are given below, the definitions being omitted.

Non-textile *factories* comprise—

Part I.

Blast furnaces, bleaching and dyeing works, bookbinding works, cartridge works, copper mills, earthenware works, electrical stations, flax scutch mills, foundries, fustian-cutting works, glass works, indiarubber works, iron mills, letterpress printing works, lucifer-match works, metal works, paper mills, paper-staining works, percussion-cap works, print works, tobacco factories.

Non-textile *factories and workshops* comprise—

Part II.

Bakehouses, bottle-washing works, carpet-beating works, dry-cleaning works, hat works, lace warehouses, pit banks, quarries, rope works, shipbuilding yards.

APPENDIX G.

THE LONDON COUNTY COUNCIL HAS MADE THE FOLLOWING, AMONGST OTHER, PROVISIONS UNDER THE FACTORY AND WORKSHOP ACT (1901) FOR MEANS OF ESCAPE IN CASE OF FIRE. [*July* 22, 1902.]

3. The number of staircases required depends, *inter alia*, upon the following circumstances:—

(*a*) The area of the building; (*b*) the number of persons employed, or who could be employed; (*c*) the disposal of the workpeople; and (*d*) the alternative means of escape which may be available.

4. It may, however, be laid down as a general principle (subject to the exceptions hereafter mentioned), that distinct and separate alternative means of escape, exclusive of windows, loophole doors, &c., are required from each floor, by one of the following means:—

(*a*) A second staircase in the same block; (*b*) a proper staircase in another block, to which access is available on all the floors by proper openings in the party or division walls, or by external communication; or (*c*) open iron bridges where the blocks are not adjoining each other.

5. The means of escape from each of the floor levels should be placed as far apart as possible.

6. In all cases where practicable some means of escape from the roof of the building to the roof of adjoining premises should be provided.

7. In small and inextensive premises, where not more than thirty persons are employed above the ground floor, and in some cases where it is possible to provide a staircase in a central position, one properly enclosed staircase, constructed of

incombustible materials, may be accepted; but in all cases where only one staircase is provided some means of escape from the roof of adjoining premises *must* be provided.

INTERNAL STAIRCASES.

8. Staircases should be placed next to an outer wall, and must be so arranged as to deliver by means of a doorway, not less than 4 ft. 6 in. wide in the clear when the doors are open, direct into the outer air at the ground level into a public way or thoroughfare or some large open space. Staircases must be so arranged that persons enter the staircases from any floor level in the same direction as persons descending the staircases.

9. They must be properly lighted and ventilated by windows.

10. Staircases, including landings and passages from one flight to another, must be enclosed with newel and enclosing walls, not less than 9 in. thick, carried up above the roof and ceiled with iron and concrete.

11. Staircases must be constructed of incombustible materials; solid square or spandril steps, arranged in straight flights, without winders; each flight must consist of not more than fifteen steps, which must be supported at both ends on brickwork, and landings must be provided at the top and bottom of each flight and between the flights. Such steps and landings are to be of the same width as the staircase [see (14) below] and not less than 6 in. thick. . . .

12. The treads must not be less than 10 in. wide clear of nosings, and the risers must not be more than $7\frac{1}{2}$ in. high.

13. Staircases must be provided with handrails fixed upon both sides thereof, and continued round the landings and chased into the ends of the newel walls.

14. The width of the staircases is to be regulated as follows:—

(*a*.) Where the premises are adapted for the employment of not more than 200 persons on the floors above the ground floor, the staircase must be not less than 3 ft. 6 in. wide.

(*b*.) Where adapted for more than 200 persons on the floors above the ground floor, or where more than 100 persons are employed on any one floor above the ground floor, the staircases must not be less than 4 ft. 6 in. wide.

15. Staircases must in all cases be connected with all floors and the roof by means of doorways of the same width in the clear when the doors are open, as the stairs.

17. All doorways to staircases must be fitted with doors . . . in two folds, hung so as to open in the direction of exit or to swing both ways clear of stairs, landings, passageways and footways. . . .

External Staircases.

19. In cases where external iron staircases are accepted by the Council as means of escape, they must be constructed with dead bearings and without cantilever work.

20. They must comply with the requirements, Nos. 8-17, as regards width, going, width of treads, height of risers, doors, handrails, &c.

25. Clear gangways, at least 3 ft. 6 in. wide, must be kept up to, and between, all staircases, bridges, and exits on all floors.

26. All such doorways, and all passageways, must, where of a less width than 3 ft. 6 in., be increased to that width.

29. Lifts should be enclosed all up with brickwork 9 in. thick, *or with incombustible material of approved quality and thickness*. . . .

30. Lifts must be kept at some distance from staircases, and must in no case be connected directly therewith by means of openings or otherwise.

Note.—For factories commenced prior to 1892, and for workshops, laundries, &c., commenced prior to 1896, certain modifications are permitted under No. 18.

APPENDIX H.

NOTES ON THE LAYING-OUT AND PLANNING OF TENEMENTS ON THE BOURNE ESTATE, CLERKENWELL, BY THE LONDON COUNTY COUNCIL.

BOURNE ESTATE, INCLUDING REID'S BREWERY AND UNION BUILDINGS SECTIONS.

THE estate comprises an area of 4⅝ acres, on which have been erected twelve block dwellings, containing 764 tenements (housing two persons per room), for the accommodation of 3,902 persons.

The tenements are arranged as under :—

1	estate office,
1	estate workshop and store,
64	bicycle sheds,
37	shops,
31	tenements of 1 room,
375	tenements of 2 rooms,
263	tenements of 3 rooms,
94	tenements of 4 rooms,
1	tenement of 5 rooms.

The buildings were planned for the internal blocks to lie North and South, so as to obtain the maximum of sunlight in the living-rooms, and each tenement has at least one room looking upon a garden.

The type of plan designed for these buildings is an improved balcony plan, arranged so that the living-rooms and the bedrooms do not look on any of the balconies, and have an unobstructed light.

The buildings are five storeys high, with a few attics, and are constructed of fire-resisting materials with steel joists and coke breeze floors.

All the sculleries and water closets are separated from the habitable rooms by ventilated lobbies.

Gas on the automatic pre-payment system is laid on, by arrangement with the Gas Company.

The height of the rooms is 8 ft. 6 in. The average area of the living-rooms is 150 ft. superficial, and of the bedrooms 100 ft. superficial.

The average cubic space in the living-rooms is 1,275 ft., and in the bedrooms 850 ft.

Cost per room—approximately £95. 10s.

Total cost—£221,000.

Persons per acre including half roads—703.

APPENDIX K.

NOTES ON BAPTIST CHAPELS.

FURNISHED BY MR ARTHUR KEEN, F.R.I.B.A.

BAPTIST Chapels are essentially for congregational purposes. No liturgy is used: the sermon is the principal part of the service; the prayers are extempore and the singing is all congregational. The service is conducted from the pulpit by the minister, occasionally assisted by a member of the congregation; and the building must therefore be planned in such a way that the whole congregation can comfortably see and hear the preacher.

Sittings to the number of seven hundred or eight hundred are commonly provided, but this number is often exceeded, and it is usual for about a third of the total number of seats to be in galleries.

The usual requirements are:—an entrance vestibule with communication doors to the gallery staircases, a large unbroken area for the congregation, and at the opposite end to the vestibule a platform, upon which are arranged the pulpit, communion table, organ, and seats for the choir. At the back of the platform are doors leading to the vestries; one vestry for the minister, one for the "deacons" or committee of management and usually one for ladies. There is sometimes an additional vestry for the choir.

The essential point of faith among Baptists being public baptism by immersion, a baptistery of marble or other material has to be provided. It is about 6 ft. 6 in. by about 4 ft. 6 in. with steps in addition at both ends, and the depth is about 3 ft.

It is not in constant use and is therefore customarily placed under the platform—a portion of the floor being made moveable for the purpose; it should be, however (and often is), treated as an architectural feature—for instance, in marble, with a metal balustrade around it. The usual position for it is in front of the pulpit in full view of the congregation. A far more dignified and suitable arrangement would be to place it in an accessory chapel, entered by way of a screen and communicating with the vestries.

The pulpit is large and is often of the " rostrum " type, that is to say, in the form of a raised platform with a balustrade or other enclosure to it, and is generally placed in a central position, thus differing from the practice in the Established Church.

The communion table is in front of the pulpit and there should be sufficient space about it for the convenience of wedding ceremonies.

The choir is sometimes placed on the platform in front of the pulpit and sometimes in a gallery behind it, and the organ is either behind it or on one side.

Bells are not used, and therefore a tower is not necessary.

A hall for small meetings commonly adjoins the chapel at the platform end; and there is usually a Sunday school forming part of the block of buildings—this consists of a central hall with the classes for boys on one side and for girls on the other, one or two large class-rooms for senior scholars, several small class-rooms if possible, a large room for infants (with a separate entrance) and a kitchen for the purpose of tea-meetings, &c. The Central Hall is often arranged with side or end galleries, which can be divided by screens to form class-rooms, and under these, class-rooms can be formed by means of curtains or sliding partitions. As far as possible all class-rooms should open into the main hall, so that those using them may join in the singing and prayers, but the larger class-rooms should have separate entrances from the outside.

Proper sanitary accommodation must be provided in connection with the vestries and all the divisions of the Sunday school.

It is, of course, necessary to make ample provision for exit in case of fire or panic, and the gallery staircases must be so arranged that no part of the congregation can be cut off from escape. In the example illustrated (see Plate XXII.) this is secured by making the gallery continuous round the building, so that a fourth staircase is not necessary.

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NOTES.—*An asterisk—thus* *12—*before a page number indicates two or more references on such page to the subject. Index references are not made either to the lists* (*a*) *and* (*b*) *in Chapter III. or to similar lists elsewhere; also asterisk references are not made to words repeated in sequence. Where a heading or marginal note covers a repetition of the same words, it is indexed as one reference.*

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